U.S. DEPARTMENT OF COMMERCE
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PB-298 614

Fish and Wildlife Protection in the Planning and Construction of the Trans-Alaska Oil Pipeline

Alaska Univ, Anchorage Inst of Social and Economic Research

Prepared for

Fish and Wildlife Service, Washington, DC Office of Biological Services

Oct 78

EPA-600/7-78-127
October 1978

PB 298614

Biological Services Program

FWS/OBS-78/70
October 1978

Fish and Wildlife Protection in the Planning and Construction of the Trans-Alaska Oil Pipeline

Interagency Energy-Environment
Research and Development
Program Report

Office of Research and Development
U.S. Environmental Protection Agency

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TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-600/7-78-127	2.	3. RECIPIENT'S ACCESSION NO. PB298614
4. TITLE AND SUBTITLE FISH AND WILDLIFE PROTECTION IN THE PLANNING AND CONSTRUCTION OF THE TRANS-ALASKA OIL PIPELINE		5. REPORT DATE October 1978 issuing date 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Thomas A. Morehouse, Robert A. Childers, and Linda E. Leask, Institute of Social and Economic Research, University of Alaska, Anchorage		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Department of Interior Fish and Wildlife Service Office of Biological Services Interior Bldg. Washington, D.C. 20240		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO. 14-16-0009-77-022
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Research & Development Office of Energy, Minerals & Industry Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED 14. SPONSORING AGENCY CODE EPA/600/17

15. SUPPLEMENTARY NOTES
This project is part of the EPA-planned and coordinated Federal Interagency Energy/Environment R&D Program.

16. ABSTRACT
"A Case Study of the Fish and Wildlife Aspects of the Pre-Permit and Construction Phases of the Trans-Alaska Oil Pipeline" looks at how government agencies developed standards for protecting fish and wildlife along the proposed pipeline route before construction and how the organization that was established to safeguard those resources worked during construction. The 300-page report deals primarily with federal government planning for and surveillance of the pipeline project, but also includes some discussion of State of Alaska activities before and during construction. After looking at how government standards and priorities for technical and environmental surveillance evolved before construction, the study focuses on the Joint Fish and Wildlife Advisory Team, an organization of state and federal biologists that advised the separate state and federal surveillance agencies on how to best protect fish and wildlife during pipeline construction. This joint team had a degree of autonomy from the broader government organizations, which had authority to direct the pipeline builders to take protective measures. The report concludes that government agencies gave priority to insuring pipeline integrity and expediting the project. But the study also finds that the semi-autonomous Joint Fish and Wildlife Advisory Team was an effective organization for protecting fish and wildlife interests and that, with some modifications, the joint federal-state approach to environmental protection should be used on future large projects.

17. (Circle One or More) KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS			b. IDENTIFIERS/OPEN ENDED TERMS			c. COSATI Field/Group		
Ecology	Hydrology, Limnology	Energy Conversion	Control Technology:	Processes & Effects:	Fuels:	6F	8A	8F
Environments	Biochemistry	Physical Chemistry	Energy Extraction	Transport Processes	Coal	8H	10A	10B
Earth Atmosphere	Earth Hydrosphere	Materials Handling	Coal Cleaning	Ecological Effects	Oil/Gas	7B	7C	13B
Environmental Engineering	Combustion	Inorganic Chemistry	Flue Gas Cleaning	Chem., Meas. & Moni.	Oil Shale			
Geography	Refining	Organic Chemistry	Direct Combustion	Health Effects	Nuclear			
		Chemical Engineering	[illegible]	Integrated Assessment	Geothermal			
Other:			Nuclear	Energy Cycle:	Solar			
			Thermal	Extraction	Waste as Fuel			
			Improved Efficiency	Processing	[illegible]			
			Advanced Systems	Conversion	Multi-fuel (3 or more)			
				Utilization				
			Other					

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES 134
	20. SECURITY CLASS *(This page)*	22. PRICE PC A07 MF A01

EPA-600/7-78-127
October 1978

FWS/OBS-78/70
October 1978

Fish and Wildlife Protection in the Planning and Construction of the Trans-Alaska Oil Pipeline

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Performed for
Fish and Wildlife Service
U.S. Department of the Interior
Washington, D.C. 20240

This study was conducted as
part of the Federal Interagency
Energy-Environment Research
and Development Program,
U.S. Environmental Protection Agency

Foreword

The discovery of huge oil deposits on Alaska's North Slope in 1968 resulted in immediate planning for rapid transport of oil to U.S. markets. Concurrent with consideration of alternative means for moving the oil, including preliminary design of a proposed pipeline, an aroused general public demanded earnest governmental evaluation of the environmental impacts of the project. This growing awareness and concern was reflected in the passage of the 1969 National Environmental Policy Act requiring an Environmental Impact Statement on any proposal for major Federal actions significantly affecting the quality of the human environment.

These developments set the stage for subsequent court battles and Congressional actions. Many agencies representing various interests of the Federal Government, the State of Alaska, the private sector, as well as numerous individuals concerned with conservation of fish, wildlife and the environment, expressed frequently differing viewpoints and contributed a variety of recommendations. For most parties, the Trans-Alaska Oil Pipeline project—one of the largest and most costly ever to be undertaken—entailed a new set of parameters and required novel analyses and approaches. Nonetheless, important decisions were reached regarding authorities, responsibilities, organizational structures, and relationships among government agencies, and between government and private industry.

From the outset of the project, the U.S. Fish and Wildlife Service recognized the unique opportunity it offered to gain insight into the complex developmental process characteristic of such an enterprise. From the beginning and throughout the process the Service conducted studies to help minimize the environmental impacts of construction of the pipeline. Among these, the present report, *Fish and Wildlife Protection in the Planning and Construction of the Trans-Alaska Oil Pipeline*, focuses on fish and wildlife protection issues in the course of planning, establishing, and conducting monitoring activities. In addition, it explores the rationale behind the decisionmaking process and offers recommendations for improved environmental management in future cases.

The principal usefulness of the study comes from the guidance it offers for the conduct of future projects requiring similar monitoring efforts, such as the Arctic Gas Pipeline, or any other large scale enterprise in Alaska and elsewhere. As a study of significant environmental management issues, it will be of interest to a variety of users, including government agencies, private industry, resource managers, the environmental community, and the academic community.

Lynn A. Greenwalt

Lynn A. Greenwalt
Director, U.S. Fish and Wildlife Service

Acknowledgements

We are indebted to many people for their cooperation and support in preparing this study. Norval Netsch and Sumner Dole of the U.S. Fish and Wildlife Service served as their agency's project officers for the study contract; they consistently supported the independence of our research while providing encouragement and assistance.

Morris J. Turner, acting authorized officer of the Alaska Pipeline Office, helped assure the cooperation of APO central office and field staffs and personally contributed valuable information. State pipeline coordinator Charles Champion was similarly cooperative to the extent of our more limited work on the state's pipeline surveillance organization. We particularly want to thank Julius Rockwell, APO-Joint Fish and Wildlife Advisory Team fisheries biologist, for helping to guide us through some of the intricacies of his professional field. Jewell Darr of APO's administrative staff graciously and efficiently accommodated our rather extensive requests for file materials.

James Hemming, federal coordinator, and Allan Carson, state supervisor, of the Joint Fish and Wildlife Advisory Team made it possible for us to look closely at JFWAT's experience. They and their JFWAT colleagues provided much critical information and many insights, and we are extremely grateful to them and to their support staff.

We want finally to thank our institute colleagues—particularly Michael Scott and Arlon Tussing—for their suggestions and interest in the project; Susan Yates for organizing the administrative support necessary to our work; and Marjorie Matlock for the care and patience with which she typed the various drafts of our manuscript.

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Executive Summary

Scope and Purposes

Stretching from the Arctic Ocean 800 miles south to Prince William Sound, the trans-Alaska oil pipeline crosses hundreds of fish streams and habitats and migration routes of dozens of species of animals and birds. How these fish and wildlife along the route were to be protected during pipeline construction was a question State of Alaska and U.S. government agencies began considering in 1969, when a group of oil companies proposed to build the pipeline which would carry oil from the recently-discovered Prudhoe Bay field.

By 1974, when work on the pipeline system began, the federal and state governments had established environmental and technical standards the pipeline builders agreed to meet and had set up separate surveillance organizations to oversee construction along the route crossing about 550 miles of federal and 250 miles of state land. These organizations—the federal Alaska Pipeline Office and the State Pipeline Coordinator's Office—were intended to concentrate, as much as possible, responsibilities of various government agencies for regulating projects affecting public land and thus to increase efficiency of government pipeline surveillance.

Although forming separate surveillance agencies, the State of Alaska and the Department of the Interior agreed on establishment of a joint organization to advise both surveillance agencies on how best to protect fish and wildlife during pipeline construction. The resulting Joint Fish and Wildlife Advisory Team (JFWAT), made up of biologists drawn from several federal and state agencies, often clashed with the broader surveillance organizations during construction, largely over whether the pipeline builders were protecting fish and wildlife as they had agreed to do and whether priority should be given to quick completion of the pipeline or protection of resources along the route.

This report looks first at how government surveillance policy—particularly policy toward fish and wildlife protection—evolved in the years between the Prudhoe Bay discovery and the start of pipeline construction, discussing the forces that led to the establishment of JFWAT and determined its place within the larger government surveillance system. Second, it examines how the surveillance system worked during the construction period, concentrating on fish and wildlife protection activities. This is not an assessment of the environmental impacts of the trans-Alaska pipeline, but rather an examination of how the organization that was ultimately established to protect fish and wildlife worked during construction and what factors influenced its effectiveness. The report looks primarily at involvement of federal agencies in the pipeline planning and construction processes, but also includes some discussion of state planning and surveillance activities.

Planning Period: 1969-1973

After a group of oil companies applied for federal approval to build a pipeline spanning all four of Alaska's major physiographic regions, three mountain ranges, and several earthquake faults, national environmental organizations initiated a court suit that held up the start of construction until after the Trans-Alaska Pipeline Authorization Act was passed in late 1973. During this four-year delay, government pipeline planning and policy making was dominated by two basic forces—conflicts between energy development and environmental interests and objectives; and jurisdictional claims and counterclaims among government agencies at both state and federal levels. Also involved were questions of the relative extent and limits of federal government and state government authority and differing philosophies of government responsibility for the regulation of private industrial development. The general outcomes of this complex of forces were:

1. Energy development objectives had priority over environmental protection objectives but not to the exclusion of the latter.
2. Agencies at both federal and state levels whose capabilities and interests were most consistent with the development priority tended to dominate in the pipeline planning and later the construction surveillance processes.

3. The federal government effectively asserted primary control over pipeline surveillance matters, and the State of Alaska played a secondary role—except in the area of fish and wildlife protection.
4. Government responses to the oil companies' interests in pipeline construction tended overall to be facilitative, but government also demanded assurance of the structural integrity of the pipeline, which, in turn, helped assure longer-run environmental integrity as well.

Early on, the Department of the Interior became the lead agency for pipeline planning. And Interior's Bureau of Land Management (BLM), with its responsibilities for land and resource conservation and management and its jurisdiction over federal lands along the prospective right-of-way, began working in 1969 in Alaska with oil companies planning the project. By the end of the year, BLM had established a pipeline division in Alaska, headed by an engineer. Fisheries and wildlife biologists had joined the pipeline division by 1970, and the division's fisheries biologist helped organize the Interagency Fish and Wildlife Team, an informal group of federal and state biologists who shared information and coordinated efforts on a series of environmental studies that had been initiated along the proposed route by various agencies.

Reflecting an early federal government emphasis on protection of the environment during pipeline construction, the BLM's resource management staff led an interagency effort in 1969 to prepare environmental "stipulations" the pipeline builders were to meet in construction and operation of the line. Representatives of fish and wildlife agencies were involved in writing these stipulations and in the next several years also took part in preparing the environmental impact statement required for the pipeline project under the National Environmental Policy Act.

But even as the environmental stipulations were being written, the seriousness of permafrost, seismic, river crossing and other technical-engineering problems became ever more apparent, and Interior's U.S. Geological Survey was drawn increasingly into pipeline planning. In 1970, it was determined that a set of technical stipulations should be developed in addition to the environmental stipulations, and government emphasis shifted to basic technical problems affecting pipeline integrity, with planning initiative and influence moving to those agencies and officials best equipped to deal with technical problems. Also, assuring pipeline integrity came to be seen as the best means of protecting the environment in the long run. This shift in emphasis resulted in fish and wildlife agencies in Alaska having less opportunity to play active and direct roles in the planning process than they had had in 1969 and 1970, before engineering problems overshadowed more subtle environmental concerns.

During this planning period (and later in the construction period), the State of Alaska's role was secondary to the federal government's; the pipeline project was of national interest, was involved in interstate commerce, and depended primarily on federal policy actions. Also, the state government had taken an early, strong position—primarily for economic reasons—in support of pipeline construction and left formulating an environmental surveillance policy mainly in federal hands.

Construction Period: 1974–1977

In late 1973, the Trans-Alaska Pipeline Authorization Act was passed, calling for "expeditious construction" of the pipeline. This clear congressional directive for quick completion of the line and the emphasis on technical-engineering problems that had evolved during the years of pipeline planning became the mainstays of government surveillance policy during pipeline construction. But environmental concerns were by no means ignored in the 1973 act; federal officials were directed to insure environmental impact was held to a minimum, and the act outlined broad protective and remedial measures the pipeline builders were to take.

When construction of the pipeline was approved by the federal government, the Interior Department created a surveillance agency, the Alaska Pipeline Office, outside the BLM and under the Office of the Under Secretary. The state also established the State Pipeline Coordinator's Office to oversee construction across state lands. In early 1974, the state and federal governments and the oil companies making up Alyeska Pipeline Service Company signed right-of-way agreements for construction of the pipeline; these agreements outlined broad environmental and technical standards ("stipulations") the pipeline builders were to meet. Before and during construction, the federal and state surveillance organizations established, based on biologists' recommendations, several specific standards the pipeline builders were to meet under the broad requirements of the environmental stipulations for protection of fish and wildlife—major river crossings were to be constructed during certain periods when biologists judged effects on fish would be least; speed of water passing through culverts was not to exceed specified rates affecting fish passage; standards were set for construction of buried and elevated big game crossings.

The Alaska Pipeline Office and the State Pipeline Coordinator's Office were to enforce those standards through both office and field staffs, and the heads of both organizations had broad authority to approve variations from the stipulations if the pipeline builders could show the need for them.

The state and federal governments also signed a cooperative agreement calling for joint protection of fish and wildlife along the route; this provision in the cooperative agreement led to the formation in May 1974 of the Joint Fish and Wildlife Advisory Team (JFWAT), made up of biologists detailed from the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Bureau of Land Management for the construction period.

JFWAT was to advise the two broader surveillance organizations on how best to protect fish and wildlife during construction. The team's office and field staffs made recommendations to the Alaska Pipeline Office and State Pipeline Coordinator's Office, but had no authority to direct Alyeska to take action. All positions of authority in the Alaska Pipeline Office during construction were held by engineers who determined if Alyeska was meeting required standards, and if not, what actions Alyeska should be directed to take.

Although advisory to the broader surveillance organizations, the biologists detailed from several agencies brought with them some statutory authority of their home agencies, and this authority—particularly the Alaska Department of Fish and Game's authority to restrict activities in anadromous fish streams—together with the team's unique joint structure that placed it somewhere between the separate surveillance organizations, gave the team a degree of independence from those it advised.

Major Findings and Conclusions

This report finds that the effectiveness of JFWAT was influenced by several factors:

1. Broad government surveillance policy that placed priority on assuring pipeline integrity and completing the project quickly.
2. Alyeska's failure to establish an effective environmental quality control program during pipeline construction, placing unanticipated burdens on small government monitoring staffs.
3. Inconsistent stipulation enforcement among all government field monitors, due largely to lack of training in stipulation interpretation and application and inadequate direction from heads of surveillance organizations.
4. Inexperience of many JFWAT biologists in monitoring large construction projects and insufficient engineering expertise within JFWAT.
5. Unwillingness of some government engineers to accept biologists' assessments of the significance and urgency of situations affecting fish and wildlife.
6. General lack of understanding of each other's professions among biologists and engineers.

But the major finding of the study is that despite the surveillance system priorities and other factors that affected JFWAT, the team's unique position "inside and outside" the separate government surveillance organizations and the statutory authorities members brought with them, strengthened JFWAT by giving it a degree of independence within the larger surveillance system. In a more clearly defined hierarchical system, it is doubtful that fish and wildlife interests would have had the influence they had during pipeline construction; despite efficiencies to be gained by concentrating government surveillance authorities within a single agency, there are clear advantages—particularly for agencies representing nondominant interests, as did the fish and wildlife agencies in this case—in allowing for the exercise of independent authority as well.

The study recommends that with improved training for fish and wildlife and other government monitors and more clearly defined standards for applying government requirements and other modifications, a joint federal-state advisory group similar to JFWAT should be established to protect fish and wildlife during future large construction projects.

Fish and Wildlife Protection in the Planning and Construction of the Trans-Alaska Oil Pipeline

Part 1 – Introduction

Chapter I — Introduction

We view our work as being a job to make sure this line is built as quickly as possible, with a minimum of disturbance to the environment.

—Andrew Rollins, authorized officer
Alaska Pipeline Office
October 1974[1]

Due in no small part to surveillance efforts, the pipeline project has been fairly successful in avoiding adverse environmental impacts. However, when compared with the ideal, or with the degree of impact that would be possible without certain time and money constraints, success in avoiding those impacts has been only partial.

Robert LeResche, chief, habitat protection section
Alaska Department of Fish and Game
April 1976[2]

How the environment was to be protected during trans-Alaska pipeline construction was a question government officials considered before and during construction, and broad-ranging requirements for safeguarding the environment were established by the federal and state governments before work on the pipeline project began. But as the above comments indicate, there were differences among government officials over what priority should be given quick completion of the project as compared with protection of resources along the route, and what constituted "minimum" environmental impact. The question of most concern in this study is: how and to what extent were fish and wildlife protection objectives in particular accommodated in the planning and building of the trans-Alaska oil pipeline? An answer to this more limited question may provide grounds for broader conclusions concerning how far the art of environmental protection was advanced and how effectively government performed its environmental surveillance functions in this case.

Scope and Objectives

The objectives of this case study are to:

1. describe how fish and wildlife protection values were dealt with in the processes of planning and building the trans-Alaska pipeline;
2. explain why decisions and outcomes affecting fish and wildlife protection occurred as they did; and
3. draw conclusions and make recommendations for government surveillance of future development projects in Alaska and elsewhere.

This is a study of government environmental surveillance policy, organization and process, focusing on the fish and wildlife aspects of pipeline planning and construction between 1969 and 1977. It is not an assessment of the environmental impacts of the trans-Alaska pipeline or even of its effects on fish and wildlife, except as these enter into descriptions of how the pipeline monitoring process worked. This study instead assesses the planning and decision making by government agencies that established the framework and set the rules for environmental surveillance, emphasizing its fish and wildlife aspects. The report concentrates on involvement of federal agencies, but also includes some discussion of activities of state government before and during pipeline construction. We are concerned with how and why certain decisions were made, who made them, and with what results.

Many government agencies at federal and state levels participated in pipeline-related activities between 1969, when Alyeska submitted its application for a federal right-of-way permit, and 1977, when oil began to flow through the finished line. The first five years were devoted primarily to planning work by government agencies and Alyeska, although there was an early flurry of development activity—road and camp construction and materials transport—before all such activity was effectively halted by court action in early 1970, when national environmental organizations challenged the authority of the Department of the Interior to grant a right-of-way permit.

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[1] Arctic Environmental Council, *Report on the On-Site Visit to the Trans-Alaska Pipeline System*, October 1974, p. 10.

[2] Testimony of Robert E. LeResche before the Federal Power Commission (no date, approximately April 1976).

The ensuing four-year delay provided time for planning and, particularly, for dealing with basic technical and engineering problems of pipeline construction in Alaska's arctic and subarctic environment and through its active earthquake zones. These problems may have delayed full-scale construction activity in any case, but the environmentalists' court suit ensured that time would be available for confronting such problems. In addition to involvement with Alyeska's design and engineering activities, planning work by government agencies during this period included development of technical and environmental stipulations, preparation of an environmental impact statement, and environmental research necessary to support pipeline planning and, later, general surveillance and construction monitoring activities by government.

Construction began in early 1974, after Congress had cleared away the legal blocks by enacting authorizing and related legislation in late 1973. "Surveillance" officially began with the construction start and, as used here, the term refers to the full range of government design review, field monitoring, and technical evaluation activities during the 1974-1977 construction period. "Monitoring" refers primarily to specific field-level oversight work of government agencies during the construction period. The surveillance and monitoring activities consisted of technical-engineering and environmental protection components, and central to the environmental surveillance activities were the fish and wildlife protection elements that are principal concerns of this study. The object of all these planning and surveillance activities was project construction, which included access roads, work pad, airports, camps, pump stations, communication sites, and the Valdez terminal as well as the pipeline itself.

Within the larger universe of the pipeline project, this study focuses on federal fish and wildlife agency involvement in planning and surveillance activities surrounding mainline construction problems, with limited discussion of involvement of state agencies responsible for protecting fish and wildlife. The report does not deal with surveillance at the Valdez terminal and looks only briefly at surveillance on the 360-mile haul road built in conjunction with the pipeline.

In the planning phase, from 1969 to 1974, most of the involvement of the fish and wildlife agencies occurred through their work with the Bureau of Land Management's pipeline division in Alaska. And once construction was underway, from 1974 on, it occurred primarily through the Joint Fish and Wildlife Advisory Team (JFWAT) which advised federal surveillance authorities in the Department of the Interior's Alaska Pipeline Office (APO) and state authorities in the State Pipeline Coordinator's Office (SPCO).

Approach and Methods

The principal study design task was to select a consistent "study path" through the universe of events, issues, actions, and decisions comprising pipeline planning and surveillance between 1969 and 1977. Our chief concern was with how fish and wildlife protection interests fared throughout the entire process of project planning and surveillance by government. At the same time, we wanted to ensure that in breaking out "fish and wildlife aspects," we did not artificially sever them from many other aspects of the process on which they depended and with which they interacted. In other words, in focusing on the fish and wildlife elements, we sought to keep them in perspective as parts of a much larger planning and surveillance system. Only with such perspective would it be possible to reach any significant conclusions about the status and meaning of fish and wildlife matters, how effectively they were accommodated within the system, and what, if anything, might be done to strengthen their part in future development-surveillance projects.

We designed the research as follows:

1. We viewed the 1969-1974 pre-permit years as a policy development and planning phase in which basic decisions and commitments were made that determined not only how effectively fish and wildlife values were incorporated into the planning process, but also strongly influenced the place they would have in subsequent construction surveillance activities as well.
2. We identified and analyzed elements of policy development that appeared to have most significance for assessing the fish and wildlife aspects of this case. These included federal policies on energy development and en-

vironmental protection, the interests and objectives of federal and state agencies directly concerned with the project, and the allocation of authority among agencies for pipeline project planning and regulation.

3. We then focused on federal and state fish and wildlife agencies' participation and their interests in specific parts of the planning process. These parts included pipeline routing and alignment decisions, technical and engineering design work, stipulation development, environmental impact statement preparation, and fish and wildlife data collection and analysis.
4. We similarly approached the 1974-1977 construction phase—that is, we moved from the general to the specific, looking first for broader policy and organizational factors affecting fish and wildlife protection interests, and then concentrating on critical problem areas of fish and wildlife-related surveillance operations.
5. JFWAT provided an explicit organizational focus for the analysis of construction surveillance, but we attempted to assess JFWAT's role within the general context of surveillance policy, organization, and operations. For this purpose we included within the scope of our analysis the full range of surveillance-monitoring functions potentially affecting fish and wildlife protection values and interests; from the design review/notice to proceed process, through construction monitoring, to the uses of environmental surveillance enforcement authority and sanctions in the field.
6. Finally, in order to show in some detail how the process of fish and wildlife monitoring, including enforcement of stipulations, worked in the field, we selected two major areas of environmental problems—stream crossing construction and big game crossing construction—and, within them, concentrated on specific cases and recurrent issues.

Primary sources of data for filling in the above study framework were the files of government agencies and interviews with participants in planning and surveillance activities. Secondary sources included surveillance evaluation reports prepared in-house by surveillance personnel or by contract consultants and evaluation reports by external parties such as congressional committee staff, the General Accounting Office, and the Department of the Interior's Office of Audit and Investigation. Other sources included congressional hearings and reports, periodicals, and various published and unpublished papers and reports by other participants in and observers of pipeline surveillance.

All interviews were conducted between March and October 1977 as pipeline construction operations were winding down and essentially completed. In some instances, this limited our sources as the surveillance staffs began dispersing to other jobs and locations, but in general this was not a serious limitation. Most of the interviews were with Alaska Pipeline Office (APO) and Joint Fish and Wildlife Advisory Team (JFWAT) officials and staff members, including central office and field personnel. There was also substantial interviewing of informants in Washington, D.C., and Alaska who were participants in the policy development and planning phase of the project. In all, about 100 separate interviews were conducted with about 70 different informants.

APO and JFWAT files provided the largest amount of documentation available to us during the course of the research project. Although Department of the Interior files in Washington, D.C., were not accessible, APO's files, which extended back to the beginning of the planning period, together with extensive interviewing, provided information essential to reconstructing and analyzing pre-permit developments of concern to this study.

Because the analysis depended heavily on interviews, the researchers endeavored always to obtain the independent recollections and viewpoints of at least two or more individuals who had direct knowledge of an issue or event of concern. Further, during the course of the study, the researchers periodically met to check and test their perceptions and understandings of how things happened and why, given both the interview and file information collected and analyzed to that point. Interview reports were prepared in all cases and distributed to each researcher within a few days of an interview. Similarly, file documents were frequently exchanged and commented upon by each researcher. Throughout this ongoing analytical work, the researchers progressively refined and clarified the pathway they were taking through the study universe.

In the final stages of analysis and report writing, each researcher concentrated on those aspects of the study to which most of his or her own interviewing and file searches were directed during the course of the project. However, since each had previously shared and evaluated materials and checked each others' perceptions regularly throughout the research period, each was also able to check, supplement, and revise the products of the others in writing the report.

Organization of the Report

This chapter and the next constitute Part 1 of this report, which describes the nature of the study, the principal subjects of analysis, and the questions it attempts to answer. Chapter II extends the introductory discussion of this chapter by describing the pipeline system, the general characteristics of the fish and wildlife resources potentially affected by the pipeline, and the surveillance organizations.

Part 2 deals with the pre-permit phase of the pipeline project. Chapter III discusses the broader political-historical context of pipeline policy making at federal and Alaska levels. It attempts to to show the significance of energy-environmental issues and government jurisdictional conflicts for fish and wildlife protection objectives. Chapter IV then focuses on pipeline planning, discussing the evolving pattern of government agency responses to the pipeline proposal between 1969 and 1974, and indicating the extent to which fish and wildlife protection interests were accommodated in the planning process.

Part 3, the major part of the report, addresses how federal surveillance agencies met their responsibility for environmental, particularly fish and wildlife, protection during the 1974-1977 construction phase. Chapter V describes the organization of government surveillance efforts and explores the policies and assumptions upon which they were based. Chapter VI assesses how the process of protecting fish and wildlife resources worked, and identifies several critical factors that conditioned the effectiveness of those efforts. Chapter VII further develops and illustrates the analysis of earlier chapters in the context of day-to-day surveillance operations through a close examination of how government monitors dealt with problems during construction at stream crossings and at elevated big game crossings.

Conclusions and recommendations are presented in Part 4. Chapter VIII summarizes critical factors affecting fish and wildlife protection objectives in pipeline planning and surveillance, and it presents recommendations for improving future surveillance programs, emphasizing fish and wildlife aspects.

Most of this report describes and explains what happened in the past, but its underlying purpose is to shed light on what may be for future projects. Accordingly, we have not attempted to differentiate in every case those shortcomings that probably could have been avoided from those that could not, given the realities of the pipeline project and the conditions under which it was planned and built. That would require an omniscience that is not available to us as well as a much longer report.

Chapter II—Pipeline Construction and Surveillance

Pipeline System

In June 1977, crude oil began moving through the world's most publicized pipeline. On its course from Prudhoe Bay on the Arctic Ocean 800 miles south to Valdez on Prince William Sound, the trans-Alaska hot oil pipeline crosses habitats and migration routes of dozens of species of wildlife and spans hundreds of fish streams.

Built by Alyeska Pipeline Service Company, a corporation formed by eight oil companies, the pipeline system cost an estimated $8 billion and was largely completed within three years.[1] In May 1978, the pipeline was delivering nearly 1.2 million barrels of oil to Valdez daily. The system covers roughly 12 square miles and includes the 48-inch diameter pipeline, 12 pump stations, maintenance sites and a 1,000-acre terminal at Valdez. About 422 miles of the pipe are above ground; another 345 miles are buried, and there are 32 miles of above- and below-ground river and stream crossings. A 360-mile gravel haul road from the Yukon River to Prudhoe Bay was also built by Alyeska before the start of pipeline construction. This road was used by Alyeska and its contractors while the pipeline was being built, but is owned by the State of Alaska.

In April 1974 work on the haul road began, and in March 1975 the first pipe was laid. The pipeline builders used approximately 62 million cubic yards of gravel in constructing the haul road, laying a gravel work pad the length of the pipeline route, and placing protective gravel layers under other elements of the system;[2] permafrost lies below about 80 percent of the terrain the pipeline crosses. South of the Yukon River, about 120 miles of access roads to the pipeline right-of-way and pipeline facilities were built during pipeline construction, and some of these are being used during operation of the line. North of the Yukon River, six miles of permanent access roads were built.

The federal Comptroller General's office estimated in 1975 that elements of the construction project—including the pipeline and accompanying gravel work pad, the haul road, 30 camps along the route, pump stations, the Valdez terminal and several hundred material and disposal sites—would affect 50 square miles of Alaska's 586,000 square miles.[3] (See Figure 1.)

Fish and Wildlife

The territory affected by the pipeline is spread across 800 miles in a state one-fifth the size of the continental United States but with a population of less than one-half million and the "largest remaining wilderness and semi-wilderness in the United States."[4] Along the pipeline that spans all four of the state's physiographic regions, several earthquake faults and three mountain ranges are habitats, migration routes, movement zones and lambing and calving areas of many kinds of wildlife. Brown and black bears, caribou, moose, bison, Dall sheep, mountain goats, wolves, foxes, wolverines, hares, marmots, and other small mammals live in or pass through the area of the pipeline corridor. An estimated 194 species of resident and migratory birds, many of these waterbirds, have habitats or nesting areas along or near the pipeline route.[5]

The pipeline and 360-mile haul road cross about 500 fish streams populated by more than 40 species of fish, and another 500 streams where no fish have been found. Another estimated 500 streams and rivers with and without fish pass near the pipeline and haul road or other elements of the system.[6]

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[1] Amerada Hess Corporation, ARCO Pipe Line Company, Exxon Pipeline Company, Mobil Alaska Pipeline Company, Phillips Petroleum Company, Sohio Pipe Line Company, Union Alaska Pipeline Company, and BP Pipelines, Inc. make up Alyeska Pipeline Service Company.

[2] Telephone interview with Al Alson, Alaska Pipeline Office, division of land and minerals, April 5, 1977.

[3] U.S. Comptroller General, General Accounting Office, *Trans-Alaska Oil Pipeline-Progress of Construction Through November 1975*, February 17, 1976, p. ii.

[4] U.S. Department of the Interior, *Final Environmental Impact Statement, Proposed Trans-Alaska Pipeline*, Volume 1, 1972, p. xxi.

[5] Ibid., p. 161.

[6] Stream estimates from *List of Streams and Other Water Bodies along the Trans-Alaska Oil Pipeline Route*, fourth revision, July 1977, by Richard L. Johnson and Julius Rockwell.

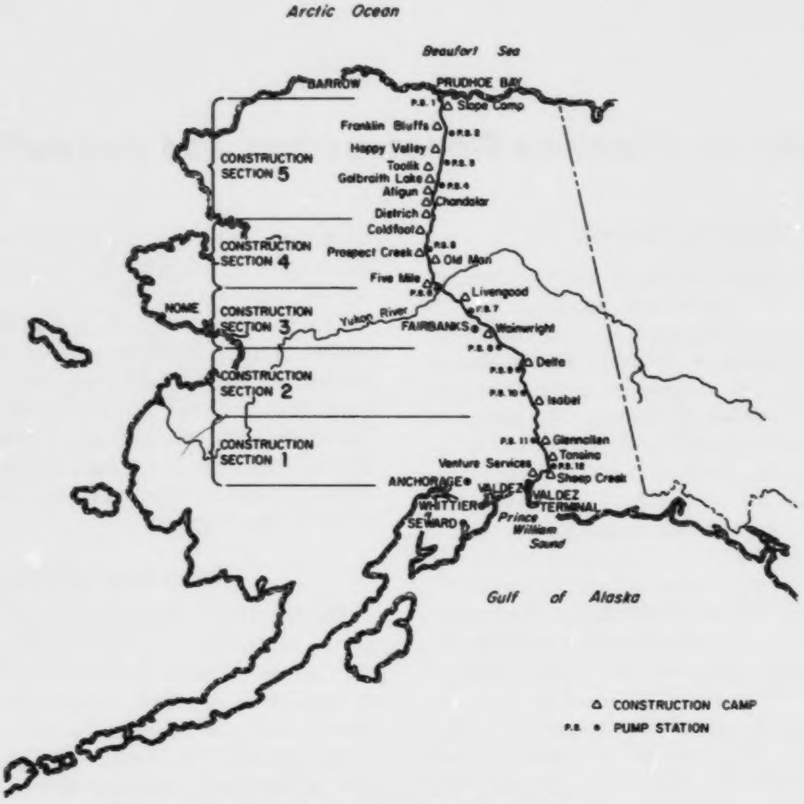
Arctic Ocean
Beaufort Sea
BARROW
PRUDHOE BAY
P.S. 1
Slope Camp
Franklin Bluffs
P.S. 2
Happy Valley
Toolik
P.S. 3
Galbraith Lake
P.S. 4
Atigun
Chandalar
Dietrich
Coldfoot
CONSTRUCTION SECTION 5
CONSTRUCTION SECTION 4
P.S. 5
Prospect Creek
Old Man
Five Mile
P.S. 6
Livengood
P.S. 7
NOME
CONSTRUCTION SECTION 3
Yukon River
FAIRBANKS
Wainwright
P.S. 8
Delta
P.S. 9
CONSTRUCTION SECTION 2
P.S. 10
Isabel
CONSTRUCTION SECTION 1
P.S. 11
Glennallen
Tonsina
P.S. 12
Venture Services
Sheep Creek
ANCHORAGE
VALDEZ
VALDEZ TERMINAL
WHITTIER
SEWARD
Prince William Sound
Gulf of Alaska
△ CONSTRUCTION CAMP
P.S. ● PUMP STATION

FIGURE 1: TRANS-ALASKA OIL PIPELINE ROUTE

Pipeline Debate

In mid-1968, following discovery of an estimated 9.6 billion barrel oil reserve at Prudhoe Bay, Atlantic Richfield Company and Humble Oil Company (now Exxon Corporation) set up a "crude pipeline task force to commence field investigations and engineering feasibility studies on using a pipeline to transport the oil from Prudhoe Bay across Alaska."[7] By 1970, six other oil companies had joined the first two, formed Alyeska Pipeline Service Company as their common agent, and proposed a pipeline that would carry oil from the North Slope to the ice-free port of Valdez.

Also during the late 1960's, as one author noted in 1973, ". . . along with the discovery of oil in the Arctic came something else, the environmental revolution. Steadily gathering a momentum that is now worldwide, was the thought that the quality of life depended upon the maintenance of unspoilt areas of wilderness where man could find aesthetic and spiritual inspiration."[8]

When the pipeline project was proposed, spokesmen for Friends of the Earth, the Wilderness Society, the Environmental Defense Fund and other national conservation groups questioned whether a trans-Alaska pipeline was the best way to transport North Slope oil, and what effects such a pipeline would have on lands, fish and wildlife in a state known as the "last frontier" and largely unoccupied and undeveloped by man. As Harvey Manning of Friends of the Earth wrote in his 1974 book, *Cry Crisis*, "If the pipeline-supertanker route is indeed the only way to bring the oil out at present, then the nation should insist that the oil stay in the ground until a better way is found . . . there is no way to predict the range of the pipeline's environmental consequences . . . ."[9]

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[7] Terry F. Lenzner, *The Management, Planning and Construction of the Trans-Alaska Pipeline System*, Report to the Alaska Pipeline Commission by the Commission's Special Counsel, August 1, 1977, p. II-2.

[8] Bryan L. Sage, *Alaska and Its Wildlife* (New York: Viking Press, 1973), p. 25.

[9] Harvey Manning, *Cry Crisis* (San Francisco: Friends of the Earth, 1974), p. 136.

Court actions filed by these national environmental groups opposed to the pipeline project as outlined by the oil companies held up the start of pipeline construction until after the federal Trans-Alaska Pipeline Authorization Act was passed in late 1973. One writer has called the project "the most monumental confrontation ever between industry and the conservation movement."[10]

There is general agreement among biologists in Alaska that detailed information about many of the species of wildlife and fish and their habitats along the proposed pipeline corridor—particularly north of the Yukon River— was lacking when Alyeska selected the route. As one government biologist involved with the project before and during construction explains, "Nobody had the reason, the means or the manpower to get that kind of information before" along a corridor running from the Arctic coastal plains to an ice-free port 800 miles to the south.[11] During those years between the discovery of oil and the start of construction, biologists working for state and federal agencies in Alaska pooled their efforts in collecting information about resources along the pipeline route.[12] Alyeska also made biological studies along the route, and together with BP Alaska and the U.S. Bureau of Sport Fisheries and Wildlife, sponsored an experiment to test the reaction of caribou to elevated pipe.[13] The federal Department of the Interior issued a six-volume environmental impact statement which included a summary of known fish and wildlife resources along the route.[14]

Right-of-Way Agreements

When the Congress passed legislation in late 1973 directing that the pipeline be built "promptly without further administrative or judicial delay or impediment," the Secretary of the Interior and "other appropriate federal officers" were directed to "issue and take all necessary action to administer and enforce rights-of-way, permits, leases and other authorizations that are necessary for or related to the construction, operation and maintenance of the trans-Alaska oil pipeline system. . . ."[15] In early 1974, seven oil companies and the State of Alaska and the federal government agreed on right-of-way pacts permitting the companies to build and later operate a hot oil pipeline across 800 miles of federal, state and private land in Alaska.[16] An eighth oil company later signed agreements with federal and state governments.[17]

The state right-of-way lease and the federal agreement and grant of right-of-way specified that all work on the pipeline system would meet existing federal and state laws governing construction and welding techniques, safety of workers, erosion and pollution control and protection of fish and wildlife. In addition, the pipeline builders agreed to meet construction standards and requirements for protection of Alaska's lands, waters and fish and wildlife as outlined in the state and federal documents. These requirements were in the form of a series of technical and environmental "stipulations" that were nearly identical in both agreements. The right-of-way pacts also specified how the owner companies of Alyeska and the federal and state governments would assure themselves that existing laws and the stipulations were enforced during pipeline construction. One of the stipulations called for the pipeline builders to "provide for continuous inspection of the Pipeline System construction to ensure compliance with the approved design specifications and these Stipulations."[18]

Before the start of pipeline construction, Alyeska Pipeline Service Company hired Fluor Alaska, Inc., to act as construction management contractor for construction of the pump stations and the Valdez terminal, and Bechtel, Inc., as construction management contractor for the pipeline and other elements of the project. These two construction management contractors were responsible for establishing quality control programs that would provide "continuous inspection" of work being done by execution contractors. In the summer of 1975, Alyeska assumed some of the functions previously handled by Bechtel, Inc., but Bechtel continued to provide quality control for pipeline construction.

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[10] Sage, *Alaska and Its Wildlife*, p. 24.

[11] Summary based on interviews with Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and Bureau of Land Management biologists who began studies of resources along the pipeline route in 1969.

[12] See Chapter IV for more information about work of the Interagency Fish and Wildlife Team.

[13] Findings of Prudhoe Bay studies compiled in *The Reactions of Barren-Ground Caribou to Simulated Pipeline and Pipeline Crossing Structures at Prudhoe Bay, Alaska*, prepared by Kenneth N. Child, Alaska Cooperative Wildlife Research Unit, University of Alaska, June 30, 1973.

[14] U.S. Department of the Interior, *Final Environmental Impact Statement, Proposed Trans-Alaska Pipeline*, 1972.

[15] *Trans-Alaska Pipeline Authorization Act*, Public Law 93-153, sections 203(a) and (b).

[16] *Agreement and Grant of Right-of-Way for Trans-Alaska Pipeline* between the United States of America and Amerada Hess Corporation, ARCO Pipe Line Company, Exxon Pipeline Company, Mobil Alaska Pipeline Company, Phillips Petroleum Company, Sohio Pipe Line Company, and Union Alaska Pipeline Company, January 1974; *Right-of-Way Lease for the Trans-Alaska Pipeline* between the State of Alaska and [same as above], May 1974.

[17] BP Pipelines Inc. did not sign the original right-of-way agreements, but later signed agreements; information from telephone interview with Morris J. Turner, APO, acting authorized officer, September 1977.

[18] *Agreement and Grant of Right-of-Way for Trans-Alakaa Pipeline*, Exhibit D, stipulation 3.2.2.4.

The 800-mile pipeline route was divided into six and later five construction sections, with different execution contractors carrying out work in each section. (See Figure 1.) In each of these construction sections and at the Valdez terminal and the pump station sites there were to be quality control inspectors. To monitor the quality control program, Alyeska established a quality assurance organization that was to "provide adequate confidence by Alyeska management that the pipeline system will meet all permit stipulation requirements."[19]

Government Surveillance System

Federal and State Organizations

The federal agreement and grant of right-of-way also directed the Secretary of the Interior to appoint an "authorized officer" to enforce terms of the federal agreement, approve the builder's pipeline designs, and monitor the work of the builder's quality control/quality assurance programs. This authorized officer was to head a new federal agency—the Alaska Pipeline Office, which was created solely to monitor pipeline construction and operation. Placed under the Office of the Under Secretary, the Alaska Pipeline Office (APO) was established in Anchorage in early 1974 and marked initiation of a new level of government monitoring of the work of industry.

The authorized officer held the authority to "order the temporary suspension of any or all construction, operation, maintenance or termination activities of Permittees, their agents, employees, contractors or subcontractors (at any tier) in connection with the Pipeline System, including but not limited to the transportation of oil." He could use this authority if he judged the pipeline builders were causing "irreparable damage" to the environment along the pipeline route, endangering lives, or failing to meet provisions of the right-of-way agreement or a directive of the Alaska Pipeline Office.[20] The chief federal monitor also had authority to approve deviations from many of the stipulations if he felt the pipeline builders had justified a request for such a deviation. APO was responsible for overseeing matters of pipeline integrity on both federal and state lands the pipeline crossed, and monitoring environmental protection on federal lands along the route.

The Department of the Interior also contracted with Mechanics Research, Inc., an engineering consulting firm, as a technical support contractor to APO. Mechanics Research was to provide "support staff, expertise and services in the scientific, technical and administrative areas,"[21] and in turn contracted with Ecology and Environment, Inc. and Gulf Interstate Engineering Corporation to provide needed knowledge in environmental and engineering fields.

The authorized officer's chief representatives at the site of construction were the authorized officer's field representatives (AOFRs) assigned to each section of the pipeline. These field representatives were delegated the same authorities as the authorized officer to halt construction, but could not shut down an entire section of the pipeline without approval from the authorized officer. During construction, all AOFRs were engineers. The technical support contractor provided field staffs to work with and provide information to the authorized officer's field representatives.

The state right-of-way lease established a similar monitoring organization to enforce stipulations on state lands the pipeline crossed, and Alaska's governor appointed a "pipeline coordinator" to head the State Pipeline Coordinator's Office (SPCO) set up in Anchorage in 1974. The pipeline coordinator had authority to halt construction on state lands. The pipeline coordinator's representatives at the site of construction were field surveillance officers (FSOs) who also had authority to stop construction on state lands; not all FSOs were engineers.[22]

Joint Fish and Wildlife Advisory Team

In 1974, the federal and state governments also signed a cooperative agreement noting that both governments "regard fish and wildlife protection as a special responsibility of the surveillance effort" and calling for "the formation, to the extent practicable, of a cooperative effort for such protection, sharing the fish and game personnel and information resources of both the state and federal governments, and the application of this cooperative effort over both state and federal lands."[23]

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[19] *Trans-Alaska Pipeline Quality Assurance During Construction*, Alyeska Pipeline Service Company, February 1975, introduction.

[20] *Agreement and Grant of Right-of-Way for Trans-Alaska Pipeline*, p. 17.

[21] *An Overview Study With Respect to Effectiveness of the Stipulations During the Construction Phase*, by Terminus Limited, August 1977, p. 8-13.

[22] Telephone conversation with Cy Price, SPCO deputy pipeline coordinator, Anchorage, October 1977.

This clause in the cooperative agreement led to the establishment in May 1974 of the Joint Fish and Wildlife Advisory Team (JFWAT), an organization made up of biologists detailed from the U.S. Fish and Wildlife Service, the Alaska Department of Fish and Game, the National Marine Fisheries Service and the Bureau of Land Management. One fisheries engineer from the National Marine Fisheries Service was also assigned to JFWAT. This team of federal and state biologists was to advise the Alaska Pipeline Office (APO) and the State Pipeline Coordinator's Office (SPCO) on how best to protect fish and wildlife along the pipeline route during construction, using the stipulations in the right-of-way agreements as guidelines.[24]

The advisory team was headed during construction by a federal coordinator who supervised the federal biologists and a state supervisor who headed the state biologists. The federal coordinator was responsible to APO, and the state supervisor was responsible to the Alaska Department of Fish and Game.

The advisory team was set up with both an office staff—separate from the office staffs of APO and SPCO—and a field staff. The office staff was to review the builder's plans and designs that could affect fish and wildlife or their habitats, and to analyze fish and wildlife-related problems that arose during construction.

JFWAT field monitors were assigned to each construction section, and were to advise AOFRs and FSOs on how to minimize effects of planned construction on fish and wildlife and their habitats, and to spot check Alyeska's compliance with the stipulations for the protection of fish and wildlife. Although JFWAT field monitors advised the field representatives of APO and SPCO, the advisory team members were supervised by the state and federal heads of JFWAT rather than by APO and APCO field chiefs.

The state members of JFWAT had authority to issue permits for in-stream construction work under provisions of Alaska Statute 16, dealing largely with protection of anadromous fish streams. Aside from this authority, the JFWAT field monitors were advisors, without authority to direct the pipeline builders. The JFWAT monitors provided information and advice to those government monitors who had authority to make decisions in the field, but were not under the supervision of those they advised. Thus, the team was part of, but in some degree independent of, the larger federal and state monitoring agencies.

Environmental Stipulations

The federal and state stipulations for environmental protection during construction of the pipeline system were nearly identical. The pipeline builders agreed to "avoid or minimize" erosion, degradation of air, land and water and disturbance of vegetation along the pipeline route. Alyeska and its contractors were to "provide uninterrupted and safe passage of fish" when construction crossed rivers and streams, and "assure free passage and movement of big game animals" during construction and after the above-ground pipe was in place.[25]

Other federal and state stipulations called for restoration of vegetation in areas affected by construction, establishment of buffer strips when construction passed near public interest areas, protection of fish spawning beds, construction of fish passage structures when necessary, screening of pump intake devices to prevent harm to fish, and plugging of any abandoned water-diversion structures. Workers were to keep mobile ground equipment out of lakes, streams and rivers unless they had written approval from the government monitors.[26]

The state pipeline coordinator and the federal authorized officer were also given power to restrict pipeline activity in designated fish and wildlife areas "during periods of fish and wildlife breeding, nesting, spawning, lambing or calving activities and during major migrations of fish and wildlife."[27]

How these broad requirements for protection of fish and wildlife outlined in the environmental stipulations were to be met in design and construction of the trans-Alaska system was a question considered by government biologists and Alyeska. In the early 1970's, state and federal biologists in Alaska worked together to develop recommendations for crossings that would allow "free passage and movement of big game animals" in areas where the pipeline was elevated. Based on information collected before construction, government wildlife biologists took the position that most caribou probably would not cross under an elevated pipe, and that therefore pipeline crossings in areas of known caribou movement would have to be buried. Also, the biologists told the pipeline builders—and in later months APO and SPCO reaffirmed these as standards for construction of big game crossings—that based on information available at the time, crossings a minimum of 60 feet long and with 10 feet of clearance between the bottom of the pipe and the top of the work pad had the "best chance" of allowing free movement of moose and bison in all seasons.[28]

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[23] *Cooperative Agreement between the United States Department of the Interior and State of Alaska Regarding the Proposed Trans-Alaska Pipeline*, January 1974, p. E-1 and p. E-4, Section II, 6

[24] JFWAT was disbanded in December 1977, several months after oil began moving through the pipeline. The APO and SPCO, however, are continuing surveillance of the pipeline operation.

[25] *Stipulations for the Agreement and Grant of Right-of-Way for the Trans-Alaska Pipeline; Stipulations for the Right-of-Way Lease for the Trans-Alaska Pipeline*, stipulations 2.2.1.1, 2.4.1.1, 2.4.1.2, 2.5.1.1, and 2.5.4.1. See Appendix A for a list of stipulations applied for protection of fish and wildlife during construction.

[26] Ibid., stipulations 2.4.4.1, 2.3.1.1, 2.5.2.2, 2.5.2.3, 2.5.1.1, 2.5.1.2, 2.5.1.3, 2.2.2.2.

[27] Ibid., stipulation 2.5.3.1.

Addressing the problem of how to provide "free and continuous passage of fish" along the pipeline system, government biologists again made recommendations based on limited information. As one fisheries biologist who studied resources along the pipeline route before construction noted, "Our knowledge of water systems along the pipeline was with some exceptions very gross. In many cases we didn't know before construction that certain streams existed, let alone whether they had fish in them, or what kinds of fish they were . . ."[29]

But based on information collected by Alyeska and government biologists in the years before construction, the Joint Fish and Wildlife Advisory Team outlined to APO and SPCO certain "critical" periods when construction would be most harmful in specific streams.[30] The APO and SPCO in turn directed Alyeska to bury pipe at major river crossings only during winter, and to limit all other in-stream construction to certain designated "windows"—periods when biologists judged construction would be least harmful to fish and habitats.[31] In addition, Alyeska agreed to install all temporary and permanent culverts in streams along the pipeline system so that at calculated 5-year flood levels, the flow through the culverts would not exceed four feet per second. An environmental stipulation required that the pipeline builders install all permanent culverts to withstand calculated 50-year floods.

In addition to culverts, the pipeline builders installed low-water crossings and bridges to move men and equipment across smaller streams, and spanned 17 large rivers along the route with bridges. The pipeline builders' quality control and quality assurance workers were to insure that design criteria agreed to by Alyeska were met during construction. The APO and SPCO field monitors and their JFWAT advisors were to make "spot checks" of work being done.

JFWAT Organization

With construction of the pipeline system essentially complete, biologists who worked with the Joint Fish and Wildlife Advisory Team or other government agencies in recommending design features to protect fish and wildlife and their habitats along the pipeline route do not know how well those protective measures have worked. Biologists report it will require years of observation to determine if the pipeline is affecting wildlife migration. Fisheries biologists say that in areas where detailed information about size of fish runs, productivity of streams and other factors was not known before construction, it will be impossible to say precisely what the effects of construction were; in areas where pre-construction information was more complete, it will require years of study to determine what long-term changes may have taken place.[32]

But how well the organization that was set up to monitor protection of fish and wildlife worked during construction is a different question. With its unique position "inside and outside" the larger government monitoring system, and its combination of federal and state biologists responsible to their own supervisors rather than APO and SPCO field representatives, JFWAT stirred much controversy within the government monitoring system while the pipeline was being built. For this report, office and field staffs of APO and JFWAT were interviewed concerning how JFWAT had worked within the monitoring system,[33] why it had worked the way it did, and how fish and wildlife protection functions might be strengthened in future large construction projects.

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[28] A more detailed discussion of big game crossings and how standards for these were developed appears in Chapter VII.

[29] Interview with APO-JFWAT fisheries biologist, Anchorage, August 12, 1977.

[30] *A Partial List of Key Fish and Wildlife Areas Along the Trans-Alaska Pipeline Route, With Critical and Less Critical Periods Identified*, Joint Fish and Wildlife Advisory Team, November 15, 1975.

[31] Information from interviews with APO's acting authorized officer and construction coordinator, August and September, 1977.

[32] Interviews with JFWAT wildlife and fisheries biologists, July, August and September, 1977.

[33] As was noted earlier, this study focuses primarily on fish and wildlife protection policies and activities of federal agencies, but does include limited discussion of state surveillance activities as well.

One Alaska Pipeline Office official saw the government monitoring system—with APO, SPCO and JFWAT—as a "three-headed monster" that decreased the efficiency of government monitoring during the project. One long-time Alaska biologist who worked as a JFWAT monitor saw the team with its authority to enforce provisions of Alaska Statute 16 as "the most effective system" for protecting fish and habitat he had seen on any construction project in the state.

An authorized officer's field representative said the government monitoring system could have been improved if the JFWAT field advisors had "reported directly to me and not to office supervisors" who could not be aware of field conditions. A JFWAT monitor felt he had to "learn strategy"—including taking problems to higher authority than the field representatives—as an advisor who had no authority to make field decisions.

A government engineer interviewed said JFWAT field monitors with little construction experience were unable to distinguish what the real problems were, and "spent their time tromping on ants when the elephants were running loose." A JFWAT field monitor said he was unable to make field engineers understand the reasons why certain actions were harmful to fish and wildlife habitat.

A JFWAT fisheries biologist felt "there would have been nothing wrong" with the system under which biologists advised those in authority in the field, except some of those with authority "were not administrators; they weren't capable of making the best use of our advice" in many cases. A former field surveillance officer said a joint federal-state advisory team was "a dandy idea" that did not work during construction "because the advisors wanted the authority."[34]

The following chapters examine preconstruction planning by government agencies that ultimately led to the establishment of JFWAT, and how JFWAT worked within the larger government monitoring system during construction. Part 2 reviews the historical background of surveillance policy and organization, and focuses on specific problems of pipeline planning government agencies faced, with emphasis on roles played by fish and wildlife interests. Part 3 discusses how the government monitoring system that grew out of earlier planning dealt with matters of fish and wildlife protection during construction.

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[34] Above quotations from interviews with APO, SPCO and JFWAT personnel; a list of persons interviewed for this report appears at the end of the report.

Part 2 - Pre-Permit Phase

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Chapter III—Policy Development: An Overview

This chapter reviews the broad political-historical context of pipeline surveillance policy making from the time of the oil discovery at Prudhoe Bay in 1968 to the passage of the Trans-Alaska Pipeline Authorization Act by the U.S. Congress in 1973. The following is not a detailed history of this extremely active "pre-permit" phase of pipeline decision making by government and industry. It is rather a discussion of the highlights of pre-permit developments, and includes characterizations of the major actors and interests that have special significance for understanding the place of fish and wildlife and related environmental protection values in the entire process of pipeline planning and construction. The next chapter deals with this same pre-permit phase in greater detail, focusing on specific problems of pipeline planning and the relationship of these problems to fish and wildlife protection interests.

Two basic sets of issues dominated the pre-permit phase of pipeline planning and policy making. One grew out of the encounter between energy development and environmental objectives and interests in the Alaska pipeline case. The other, in part a bureaucratic reflection of this political encounter, concerned jurisdictional claims and counterclaims among government agencies at both federal and state levels. Also involved were questions of federalism—the relative extent and limits of federal government and state government authority—and differing philosophies of government responsibility for the regulation or promotion of private industrial development.

The general outcomes of this complex of forces, which are discussed in this chapter and the next, can be previewed in summary:

1. Energy development objectives had priority over environmental protection objectives, but not to the exclusion of the latter.
2. Agencies at both federal and state levels whose capabilities and interests were most consistent with the development priority tended to dominate in the pipeline planning and later the construction surveillance processes.
3. The federal government effectively asserted primary control over pipeline surveillance matters, and the State of Alaska played a secondary role—except in the area of fish and wildlife protection.
4. Government responses to Alyeska's interests in pipeline construction tended overall to be facilitative, but government also demanded assurance of the structural integrity of the pipeline, which, in turn helped assure longer run environmental integrity as well.

The Pipeline Act

Ending four years of administrative and legal delays to pipeline construction, Congress passed the Trans-Alaska Pipeline Authorization Act in November 1973. In doing so, it declared that "The early development and delivery of oil and gas from Alaska's North Slope to domestic markets is in the national interest because of growing domestic shortages and increasing dependence upon insecure foreign sources," and further that "The earliest possible construction of the trans-Alaska oil pipeline from the North Slope of Alaska to Port Valdez in that State will make the extensive proven and potential reserves of low-sulfur oil available for domestic use and will best serve the national interest."[1]

The following is a brief chronology of events leading to enactment of the pipeline law:

June 1968—Atlantic Richfield Company announces discovery of "one of the largest petroleum accumulations known to the world today" near Prudhoe Bay on Alaska's North Slope.

February 1969—Oil companies decide to apply for right-of-way permits to construct a pipe-

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[1] *Trans-Alaska Pipeline Authorization Act*, Title II of Public Law 93-153, November 16, 1973, sections 202 (a), (c).

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line from the North Slope to a port on the Gulf of Alaska.

June 1969—Atlantic Richfield, Exxon, and British Petroleum, the principals in the pipeline consortium, file a formal application with the Department of the Interior's Bureau of Land Management for a trans-Alaska pipeline right-of-way.

January 1970—National Environmental Policy Act (NEPA) comes into effect, requiring preparation of an environmental impact statement (EIS) on proposals for "major federal actions significantly affecting the quality of the human environment."

March 1970—Wilderness Society, Friends of the Earth, and Environmental Defense Fund file a suit in federal District Court to enjoin the Secretary of the Interior from issuing a pipeline haul road permit without complying fully with EIS requirements and right-of-way width limitations of the Mineral Leasing Act of 1920.

April 1970—District Court agrees with the environmentalist plaintiffs, issues a preliminary injunction and, citing NEPA, orders the Secretary to consider all aspects of the project before approving any part of it.

January 1971—Department of the Interior issues draft EIS on the proposed trans-Alaska pipeline project.

March 1972—Department issues final EIS.

May 1972—Secretary of the Interior announces decision to grant pipeline right-of-way permit pending District Court orders.

August 1972—District Court lifts preliminary injunction against issuance of permit.

February 1973—Court of Appeals reverses District Court, finding that issuance of the permit would violate the right-of-way width limitations of the Mineral Leasing Act; Appeals Court does not rule on the NEPA issue, which remains for future litigation.

April 1973—U.S. Supreme Court declines to review Appeals Court decision.

November 1973—Congress passes legislation amending right-of-way provisions of Mineral Leasing Act, declaring the final EIS sufficient for NEPA purposes, authorizing construction of the trans-Alaska pipeline, and directing the Secretary to issue the permit.

The leasing act amendments and the pipeline authorization thus removed at one time the two remaining legal blocks to construction of the trans-Alaska pipeline. The amendments gave the Secretary sufficient new discretion on the question of right-of-way widths, while the pipeline authorization prevented further administrative delays and closely restricted any further litigation based on NEPA requirements. The environmentalists chose not to renew their challenge to the line in the courts, and the Secretary issued the permit.

The four-year delay was not due exclusively to the legal blocks, however.[2] There were in addition serious technical deficiencies in Alyeska's pipeline plans, and these problems surfaced soon after the right-of-way application was filed in mid-1969. Government scientists and technicians, based primarily in the U.S. Geological Survey of the Department of the Interior, were particularly concerned with the problems of burying a hot-oil pipeline in permafrost and under riverbeds, and designing a line to withstand Alaska earthquakes. These and other deficiencies affecting the physical integrity of the line, and therefore posing severe risks of major environmental damage as well, also had to be resolved before construction could be permitted.

Moreover, Congress and the Administration were not dedicated single-mindedly and at any cost to the rapid development and transport of North Slope oil through a trans-Alaska pipeline and tankers. Environmental protection was also a national policy, as reflected in NEPA, the growing array of air, land, and water anti-pollution statutes, and in government agencies and interest groups that explicitly represented environmental values and interests. Thus, although the pipeline act effectively circumvented further administrative and legal barriers posted by NEPA and placed clear priority on "the earliest possible construction" of the trans-Alaska line, the act also included environmental protection provisions that had to be met in the processes of pipeline construction and operation.[3]

Recognition of environmental qualifications, however, does not diminish the primary thrust of the congressional "mandate," strongly supported by the Administration, to get on with the construction of this giant project and to do so quickly. The fuel shortages of the winter of 1972-73 were all too real, as was the growing U.S. dependence for oil imports on the Arab states. And the Arabs used their control of oil as a weapon in international politics, imposing an embargo on exports to the United States at the very time that Congress and the President were completing action on the authorization legislation. Indeed, much of the congressional resistance to the authorization act was not directed at pipeline construction, *per se*, but at proposals for construction of a trans-Alaska line as opposed to an alternative line through Canada which could deliver Alaska's oil more directly to states in the midwest and east where fuel shortages appeared most threatening at the time. The question before Congress was not whether a pipeline should be built, but which one could be built as soon as possible.

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[2] These also included the Alaska Native land claims issue and its attendant "land freeze" until Congress passed the Alaska Native Claims Settlement Act in 1971.

[3] *Trans-Alaska Pipeline Authorization Act*, Title II, section 203(c); also see Chapter V below.

The Senate Interior Committee's report on the pipeline legislation indicates how the committee balanced the many considerations surrounding the competing alternatives, and where they finally came out. After considering a broad range of environmental, economic, and political issues, the committee reached the conclusion:

> Any assessment based solely upon the foregoing considerations regarding the relative merits of the two pipeline routes clearly must depend heavily upon subjective judgment. There is however, one consideration in favor of the Trans-Alaska pipeline that the Committee found compelling. This consideration was the additional delay and uncertainty associated with the Trans-Canada pipeline. Regardless whether the 1969 decision of the owner companies in favor of the all-Alaska route was the wisest or the most consistent with the national interest at that time, and regardless whether *the Administration's early commitment in favor of that route* [emphasis added] was made on the basis of adequate information and analysis, *the Committee determined that the Trans-Alaska pipeline is now clearly preferable, because it could be on stream two to six years earlier than a comparable overland pipe-line across Canada* [emphasis in original].[4]

So Congress passed the Trans-Alaska Pipeline Authorization Act, but at the same time required that federal officials impose stipulations including "requirements designed to control or prevent damage to the environment," and referred specifically to the protection of fish and wildlife habitat.[5]

It would be misleading if not a direct misrepresentation of the pipeline act (including the related leasing act amendments) to say that it had the "dual"—as if "equal"—objectives of pipeline construction and environmental protection. Rather, the construction objective emerged as the primary one, while the expressed concerns for environmental protection appear as qualifications or conditions placed on the overriding purpose of authorizing construction. The environmental provisions serve to indicate the *manner* in which the mandated actions were to be carried out by responsible federal officials. Development and environmental values were thus placed deliberately in tension with each other, a tension that was already structured into the federal and State of Alaska bureaucracies having statutory authorities affecting the planning and construction of the trans-Alaska pipeline.[6]

Federal Agencies and Interests

During the 1969-1974 planning phase, the roles and statuses of the several federal agencies involved with the pipeline project were affected by shifting definitions of the problem: Did the project represent mainly a technical engineering and design problem to be solved by government officials working with Alyeska? Or did it represent mainly an environmental protection problem whereby government would assume that technical design tasks were strictly Alyeska's business while the potential environmental effects of given designs were the government's? Depending on the relative emphasis placed on these concepts of the problem, agencies whose main capabilities and expertise were either on the engineering or the environmental side would play larger or lesser roles. An agency could, however—and Interior's Bureau of Land Management did—acquire the kind of expertise it needed in order to strengthen its participation in and assert its authority over the project.

In general, as government's planning activities began in early 1969, the real complexity and magnitude of the project were only dimly perceived by virtually everyone concerned in both government and industry quarters. At that time, government reviewers tended to emphasize the potential impacts of the project on the land, water and fish and wildlife of Alaska. The related activities of government agencies, such as the development of the initial draft stipulations in 1969, reflected the dominance of this concern. It was not long, however, before serious technical engineering problems surfaced in Alyeska's early plans; these had primarily to do with the permafrost question. It was at that point, in late 1969, that the roles of the technicians and engineers began to grow rapidly toward the pre-eminence they achieved during the planning period and which the engineers in particular maintained through the construction phase.

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[4] U.S. Senate Committee on Interior and Insular Affairs, *Federal Lands Right of Way Act of 1973*, Report 93-207 to accompany S. 1081, 93 Cong., 1 Sess., June 12, 1973, p. 21. For a discussion of the costs of delay to Alyeska owner companies, State of Alaska, Nation, and Alaska Natives, see Appendix D below.

[5] *Mineral Leasing Act Amendments*, Title I of Public Law 93-153, section 28 (h) (2).

[6] In addition to the explicit provisions of the authorization act and leasing amendments, pertinent existing laws remained in force. Section 203(c) of the act states that "all authorizations issued by the Secretary and other federal officials and agencies pursuant to this title shall include the terms and conditions required . . . by the provision of law that would otherwise be applicable if this title had not been enacted . . . . "

The trend of government activities and the character of government agency roles were not, of course, simple or single-dimensional. The "resource men" in the Bureau of Land Management (BLM) and the biologists and wildlife managers in the U.S. Fish and Wildlife Service (FWS) and other agencies did participate intensively, for example, in environmental impact statement (EIS) preparation, an effort that began in 1970 and was not completed until early 1972. These resource and fish and wildlife staffs also conducted a wide range of important surveys and studies that helped make pipeline alignment and design decisions more environmentally sensitive.

These and other fish and wildlife-related activities, and their relationship to technical engineering efforts, will be discussed further in Chapter IV. It is intended here only to suggest an overall pattern of government planning activity in which technical-engineering definitions of the problem dominated for the most part, especially after the first year of project activity. But the efforts to insure the physical integrity of the pipeline were at the same time considered fundamental means of assuring an environmentally safe project in the long run. This overlap of pipeline integrity and environmental protection interests, together with the "mixed mission" of an agency like BLM, which is charged with both protecting and developing resources, precludes easy labeling of agency roles in pipeline planning and surveillance.

Jurisdictional claims of federal agencies both within and outside of the Department of the Interior, however, are easier to trace. Armed with their own specialized mandates and competencies, these agencies competed for varying degrees of authority over project activities throughout the planning period and into construciton. Especialy during 1969, it was often not clear which agency was in charge,[7] even though the Interior had the lead and, within the department, BLM had direct authority over most of the lands the oil companies needed for a pipeline right-of-way. Still, the shifting emphasis between integrity-engineering and environmental protection questions introduced some ambiquity into the situation, and encouraged the fish and wildlife people, among others, to seek periodically to expand their roles in project planning decisions. Similarly, from outside of Interior, the Army Corps of Engineers made a bid for lead status in the engineering aspects of the project.

The Interior Department was the "logical" lead agency for the pipeline project for several reasons, including its authority over the affected federal lands, its mineral resource development policy and program responsibilities, and the expertise of several of its bureaus in related physical science and land resource management fields. Interior became the *de facto* lead agency for the pipeline project at the time the oil companies first applied for permits to conduct pre-construction exploration and survey work on federal public domain lands in Alaska.

This lead role was formalized in May 1969. By memorandum to the Secretary, the President officially recognized the Interior Department's North Slope Task Force, which had been established earlier that year to develop policy guidance for the project, and he requested that the task force be enlarged to include representatives of other departments, specifically Commerce, Defense, Health, Education and Welfare and Transportation.[8] Moreover, the President made the Administration's interest clear, stating "it is urgent that we consider now the ways in which we can explore and develop, without destruction and with minimum disturbance, the oil resources of northern Alaska."[9] The federal Task Force on Alaska Oil Development was thus established and, like the previous North Slope Task Force, it was chaired by the Under Secretary of the Interior.

Most of the prospective right-of-way lands for the pipeline were under the jurisdiction of the Bureau of Land Management (BLM), which was therefore the government's first point of working contact with the oil companies' pipeline consortium. Consistent with an emphasis on environmental issues, BLM had broad responsibilities for land and resource conservation and management, cutting across many of the areas of concern presented by the project. At the same time, BLM was an agency charged with promoting and managing resource development under a "multiple-use" philosophy, and this, too, was generally consistent with the Administration and department interest in the development and transport of Alaska oil resources.

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[7] Interview with Russell Train, former Under Secretary of the Interior, Washington, D.C., August 25, 1977.

[8] Memorandum to Secretary Hickel from President Nixon, May 9, 1969. Eventually, the task force also included representatives of the Department of Housing and Urban Development, Office of Science and Technology, Office of Management and Budget, Council on Environmental Quality, Environmental Protection Agency, and the National Science Foundation.

[9] Ibid.

Most working level relationships with Alyeska took place through BLM's Alaska state office, and the director of the state office acted as the Secretary's "authorized officer" for the project. By the end of 1969, a pipeline division had been established within the state office, and an engineer was recruited from the Corps of Engineers to head it. During the next year, several more engineers were hired to expand BLM's base of experience and expertise, which had until then been limited largely to land and resources management fields. The pipeline division also hired a fisheries biologist and a wildlife biologist.

BLM thus expanded its capabilities in two directions—environmental/fish and wildlife protection and engineering/construction, with the emphasis on the latter—and thereby strengthened both its competence and its jurisdictional claims over the pipeline project. But priority was clearly given to bolstering the agency's engineering competence for a project that was presenting ever more formidable technical problems. The pipeline division later transferred these capabilities, deepened and extended by the four years of experience gained during the pipeline delay, to its successor agency, the Alaska Pipeline Office.

As the seriousness of permafrost, seismic, river crossing, and other technical-engineering problems became increasingly apparent in 1969, the U.S. Geological Survey (USGS) of the Department of the Interior was drawn further into pipeline planning activities. In 1970, it was determined that a set of "technical" stipulations would need to be added to the "environmental" stipulations that had been developed in 1969 through an interagency effort headed by BLM's resource management staff. USGS was thus called upon to contribute the scientific and technical expertise necessary to develop adequate technical stipulations and to deal with a progressively wider range of technical design problems.

The "technical" efforts were organized under a Technical Advisory Board established in early 1970 as an arm of the Task Force on Alaska Oil Development. The board's first chairman was the director of USGS, and later it was headed by a technical assistant in the Under Secretary's office. A Menlo Park Working Group had been established at the California base of USGS in 1969 and later, in mid-1971, an Ad hoc Review Group was established to review Alyeska's project description. The board and its subsidiary groups were interagency organizations in which USGS had a leading role. A fourth committee under the task force was formed to deal specifically with stipulation revisions, and it was headed by the chief of BLM's pipeline division, who was also a member of the Technical Advisory Board and the Menlo Park Working Group. There was no fish and wildlife agency representation on any of these technical groups.

By the end of 1970, the second year of pipeline planning work, a series of technical engineering problems was dominating the attention of Interior officials at both Washington and field levels, and fish and wildlife protection interests now had to find their place within a much larger set of more pressing concerns. This is not to say that fish and wildlife protection interests and broader environmental concerns were ignored. Rather, it is to indicate the concentration of efforts on basic technical problems affecting pipeline integrity, and the consequent drift of initiative and influence to those agencies and officials best equipped to deal with such issues.

Fish and wildlife agency representatives were active on other fronts. The principals here were officials and staff of the Interior's Fish and Wildlife Service and the National Marine Fisheries Service (NMFS) of the Department of Commerce.[10] In Alaska, they participated in development of the environmental stipulations and review of pipeline alignment plans potentially affecting fish and wildlife resources. In these matters they made recommendations to BLM's Alaska office. FWS staff also participated in preparing the draft EIS; this draft was roundly criticized at public hearings in Anchorage and Washington in early 1971. Because more extensive interagency participation was needed, and because overcoming the environmentalists' suit depended in part on satisfying NEPA impact statement requirements, a "102 Statement" task force was established under the Task Force on Alaska Oil Development. This effort was directed from the Under Secretary's level in Washington, and the EIS group, too, was headed by an official of USGS. Representatives of several federal fish and wildlife agencies at both Washington and Alaska levels participated actively in the writing of the "living resources" sections of the final EIS that was issued in March 1972.

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[10] NMFS was the Bureau of Commercial Fisheries of FWS until mid-1970.

Beyond making recommendations to the BLM pipeline division on alignment and related decisions, proposing environmental stipulations, and contributing to the EIS, fish and wildlife agency staffs in Alaska devoted continuing efforts to studies of fisheries and wildlife resources that might be affected by the construction and operation of a trans-Alaska oil pipeline. These studies were coordinated through an Interagency Fish and Wildlife Team organized by BLM in 1970, and they continued under that arrangement throughout the pre-permit period.

By the end of 1971, the third year of project planning activity, two shifts of emphasis had occurred. First, there was a shift from an initial generalized concern with prospective environmental effects of pipeline construction to concentration on more basic and sharply focused technical-engineering deficiencies in the oil companies' early designs. This shift of emphasis had taken place by the end of the first year, notwithstanding the intensive effort in 1971 to prepare an acceptable EIS. The urgency of this latter effort, in turn, reflected a second shift that was already evident in 1970—a shift from what was primarily an Alaska-based operation centered in BLM's pipeline division to a Washington-directed process based in the Under Secretary's office and covering a full range of engineering and environmental issues that demanded policy level attention as well as intensive analysis at a technical staff level. The pipeline division in Alaska continued and increased its level of operations during this period, but by the end of 1971 an elaborate super-structure, with a Menlo Park branch, had been established at the department level.

Both the final EIS and the revised stipulations, now including separate "environmental" and "technical" components, were completed in early 1972. No additional hearings were held on the EIS, and the stipulations published in February 1972 were virtually the final draft of that document as well. In May the Secretary of the Interior announced that he was ready to approve the trans-Alaska pipeline application. The problem now was a legal and political one that remained to be resolved in the courts and in Congress. And these legal-political issues dominated attention at the Washington policy level until the pipeline act act was passed in 1973.

During this last phase of planning before the permit was granted, officials and key staff members of the involved agencies began to focus on another question that became increasingly pertinent as the final obstacles to construction were being overcome. This was the question of how a construction surveillance organization would be structured and how authority for surveillance would be allocated among the affected government agencies.

It was during this final pre-permit phase that FWS as well as other agencies made their bids for independent surveillance authority and were ultimately overruled at the department level. BLM lost its line authority over the pipeline project when the decision was made in the latter part of 1973 to transform the pipeline division into a separate Alaska Pipeline Office (APO) headed by an "authorized officer" who would report directly to the Office of the Under Secretary. A related decision was that a third-party contractor would be hired by the Interior Department to fill most of APO's needs for increased engineering and environmental expertise and staff support for construction surveillance.

These decisions concentrated authority for pipeline surveillance within Interior and blunted the claims of existing agencies both within and outside the department for independent surveillance authority, based on their special competencies. These decisions, and particularly the third-party contractor approach, effectively undercut the Corps of Engineers, which had been bidding for control over the basic engineering aspects of the project. The decisions also undermined the interests of USGS as well as of FWS, NMFS, and the Environmental Protection Agency (EPA) in expanding their parts in the prospective surveillance system and in insulating such parts from control by the APO's authorized officer.

The fish and wildlife agencies nonetheless continued to assert their claims for special status within the prospective construction surveillance system. In this effort they ultimately did achieve a significant measure of success when the Joint Fish and Wildlife Advisory Team (JFWAT) was established as a part of the surveillance structure. As later chapters will show, JFWAT provided both the conditions and opportunities for the fish and wildlife biologists to play an important part in the surveillance process, even though they were formally limited to "advising" the federal engineers.

State Agencies and Interests

Although this study focuses on fish and wildlife protection policies and activities primarily of federal agencies, it is important for present purposes to discuss the state's general posture toward the pipeline project during the planning period and the particular stance it took on the issue of organizing a surveillance system. Understanding of these aspects of the state role will, in turn, shed light on fish and wildlife protection activities that were conducted jointly by federal and state agencies in both pre-permit and construction phases of the pipeline project.

In general, the state role was secondary to the federal government's lead throughout the project. This was due in part to the circumstance that the state had jurisdiction over only about one-third of the pipeline right-of-way, while the federal government controlled the other two-thirds. Moreover, the project was of national interest, was involved in interstate commerce, and depended primarily on federal policy actions, as reflected in NEPA requirements and ultimately in the Trans-Alaska Pipeline Authorization Act and Mineral Leasing Act amendments. Government initiative was thus at the federal and not at the state level. Add to these considerations the fact that the state government took a very early and very strong position in support of trans-Alaska pipeline construction, and it becomes clearer why the problem of formulating and implementing an environmental surveillance policy was left mainly in federal hands.

The state interest, as articulated by the governor and other state officials, was in clearing the way as rapidly as possible for construction of a trans-Alaska line, and the motivation was primarily economic. In a state suffering from chronically high rates of unemployment and looking to the oil industry for its economic salvation, there were obviously high expectations for the employment and income that would be generated during the three-year construction period. Further, state government financing itself became dependent on the prospective flow of oil royalty payments and tax revenues following the North Slope lease sale of 1969. As stated by Alaska's Attorney General at the U.S. Senate hearings on the pipeline act in 1973, the problem was by then reaching crisis proportions: ". . . the State of Alaska has significantly more at stake in the deliberations on these bills than does any other state. Continuing delays on the Trans-Alaska Pipeline System are having a crippling impact upon its ability to plan coherently for the future."[11]

Although the general position of the state government in support of the earliest possible construction of a trans-Alaska pipeline was unambiguous, there were significant differences within the state administration on the issues of surveillance policy and organization. And, as was the case at the federal level, state agency differences took perhaps their clearest form as a jurisdictional struggle.[12] The participants were the commissioners of Natural Resources, Highways, Fish and Game, and Environmental Conservation, and the Attorney General, who comprised a pipeline environmental committee under a cabinet level pipeline task force. The task force's underlying purpose was to promote construction of the trans-Alaska pipeline. The committee's function was to develop policy and an organizational scheme for state surveillance that would be acceptable to the various affected state agencies and consistent with the state administration's interest in pipeline construction with minimum delay.

With one exception, there was agreement among the committee members that the individual state departments should contribute staff to a single state monitoring agency. The exception was the Commissioner of Environmental Conservation, who sought the lead status in the state's construction monitoring effort. At the same time, other departments, including Highways and Fish and Game, sought to guard their own statutory powers, keeping them independent of any new monitoring agency. Department of Highway engineers in particular opposed any scheme that would place their pipeline haul road project under the surveillance of Environmental Conservation or any similar staff.

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[11] John E. Havelock, Attorney General for the State of Alaska, *Statement* on S. 1041, Title IV, and on S.1081, before the U.S. Senate Committee on Interior and Insular Affairs, March 27, 1973.

[12] This summary of state agency positions is based on interviews with the following past and present state officials: John Havelock, former Attorney General, Anchorage, July 1, 1977; Norman Gorsuch, former Attorney General, Juneau, July 27, 1977; Charles Herbert, former Commissioner of Natural Resources, Anchorage, July 13, 1977; Guy Martin, former Commissioner of Natural Resources, Washington, D.C., August 22, 1977; and Jerry Reinwand, Deputy Commissioner of Environmental Conservation, Juneau, July 26, 1977.

These interagency differences helped block creation of a strong and autonomous state surveillance organization, and the prerogatives of individual departments, including Fish and Game, remained safe. Another effect was that the Commissioner of Fish and Game remained free to pursue his own department's interest in establishing a joint fish and wildlife surveillance team (JFWAT) with federal agency counterparts even after federal and state officials had decided to create separate surveillance offices. As a result, the state, through the Department of Fish and Game, introduced an independent base of statutory authority (fish and game laws) directly into a federally-dominated surveillance scheme that otherwise exhibited an unusual concentration of authority and degree of autonomy.[13]

During the pre-permit period, the Department of Fish and Game emerged as the most active state agency participant in the pipeline planning activities conducted in Alaska and led by BLM's pipeline division. Department biologists were especially active in the fish and wildlife studies work of the Interagency Fish and Wildlife Team. The commissioner and key members of his staff also worked closely with their federal counterparts in creating JFWAT, which assured an effective state presence in the fish and wildlife protection activities of the federal surveillance organization.

Federal-State Negotiations

Negotiations between federal and state representatives toward a cooperative agreement in construction surveillance were shaped by political, legal, and bureaucratic forces at work on both sides. On the federal side these forces included a commitment to a relatively autonomous surveillance organization that would grow out of BLM's pipeline division. On the state side they included an overriding commitment to trans-Alaska pipeline construction at the same time that separate state departments worked to protect their individual prerogatives. But there was little urgency to these negotiations until it appeared that the legal obstacles to construction would finally be cleared away by congressional action in 1973. Consequently, during all but the final months of the pre-permit period, little progress was made between federal and state negotiators attempting to deal with a complex set of federal-state jurisdictional issues.

The final resolution of these issues was incorporated in the federal-state cooperative agreement of January 1974, an agreement that registered the pattern of forces on both sides at the time. Both sides were interested in moving quickly to construction under the terms of the pipeline authorization act, prospective right-of-way agreements with Alyeska, and the environmental and technical stipulations. This common interest provided the grounds for quickly coming to terms on issues that had divided them for most of the previous three years. Essentially, the federal and state negotiators agreed not to force basic constitutional-legal issues that probably could not be resolved without prolonged litigation and the consequent threat of further pipeline delay.[14]

The quickest way to agreement was for each to accept and refine major elements of the *status quo*. Thus, the federal government would continue to concentrate monitoring authority in a successor agency to the pipeline division and retain ultimate authority over pipeline engineering-integrity questions. Further, federal and state governments would continue to cooperate in fish and wildlife protection aspects of surveillance as they had through the Interagency Fish and Wildlife Team during the planning period. Apart from this cooperative arrangement, there would be separate and independent federal and state surveillance organizations.

Between 1971 and 1972, the state almost completely reversed itself on construction surveillance policy. Initially, the governor, whose primary interest was in seeing the line built as soon as possible, proposed that "the State of Alaska and the Bureau of Land Management enter into a cooperative agreement under which the BLM will supervise construction of the pipeline and related structures on State and private lands."[15] Within a year, the state had withdrawn from this position of simply deferring to BLM. By early 1972, the state was more carefully protecting its own interests in disputes with the federal government over land ownership and control and guarding its jurisdictional claims concerning the application of state police powers, including fish and wildlife regulation on federal lands in Alaska. The state apparently did not want the pipeline surveillance case to set a precedent that might undermine its longer run claims of land ownership and sovereignty vis-a-vis the federal government in Alaska. What the state now proposed was a joint surveillance organization with co-equal federal and state authority covering both federal and state right-of-way lands. Until the pipeline authorization act was passed, however, the Interior Department negotiators tended to press for more exclusive federal control over pipeline surveillance, and the head of BLM's pipeline division was viewed by some state officials as the most adamant and uncompromising "federalist" of them all.[16]

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[13] The environmental protection responsibilities of the State Department of Environmental Conservation, on the other hand, were weakened in the area of pipeline surveillance. DEC, having over-reached for authority, damaged its relations with other departments as well as with the State Pipeline Coordinator's Office.

[14] See Appendix B below, "The Jurisdictions of the Federal and State Governments Over the Construction of the Trans-Alaska Pipeline."

[15] Letter from William A. Egan, Governor of Alaska, to Burton W. Silcock, state director, Bureau of Land Management, March 20, 1971.

With the pipeline act, both sides agreed to lay aside their more basic differences for the time being and to compromise where necessary in order to avoid further delay. Most important in the present context is that the federal and state fish and wildlife agencies were permitted to create their own niche in the surveillance system, establishing a form of joint organization that federal and state negotiators were unable to agree on for the surveillance system as a whole. Moreover, it would be organized in such a way that the state fish and game members of JFWAT, bringing their own statutory authority from the Department of Fish and Game to which they remained responsible, could fortify the federal members, who would be a formal part of APO and under its operating authority.

Government and Industry

Government agencies were confronted with new challenges in the trans-Alaska pipeline system (TAPS) proposal. It was a proposal that cut deeply and broadly across a wide range of jurisdictional and even constitutional issues between federal and state governments and individual agencies at both levels. TAPS raised a host of scientific, engineering, technical problems associated with construction in the arctic and sub-arctic. The project was caught up in the national politics of energy development and environmental conservation. And it posed new organizational problems both to the private companies that proposed it and the government agencies charged with overseeing it from its planning stages through to construction and operation.

If there were any constants in this evolving complex of issues and events, one of them was that government and industry officials were for the most part commonly focusing on the trans-Alaska project proposed by the industry, and on how to make it acceptable from engineering and environmental standpoints. In retrospect, it is clear that government's preoccupation was with TAPS and with the companies' interest in building and operating it soon, notwithstanding the intensive, but relatively short-lived, attention given to a possible Canadian alternative. The basic and ongoing task before government and industry officials was to overcome, step-by-step, the many political, legal, administrative, and technical obstacles encountered by the project during the entire course of its development. This circumstance inevitably raised issues of government responsibility for private corporate activities affecting the public interest. Among these issues were how far government can and should go in substituting its judgement for industry's and where the balance should be between a government agency's role as a regulator and its role as a facilitator of industrial development activity.

In the fall of 1969, the Secretary of the Interior informed the Senate Committee on Interior and Insular Affairs that he intended to lift the "land freeze" affecting the proposed TAPS right-of-way in Alaska, and a public hearing was held on the matter in October. Under Secretary Russell Train, representing the Secretary, had the following exchange with Senator Gaylord Nelson during the course of Train's testimony, which was in support of moving ahead with the TAPS project:

> Senator NELSON. I suppose as usual I have a minority position. I guess nobody has raised the question of why we ought to go in there and take the oil out at this time in any event.
>
> Mr. TRAIN. Well, I certainly have heard the question asked, Senator, yes. If you were to ask me whether the Department has made a decision that the oil should come out, and I think that is implicit in what you have said—first, it is not a decision that is entirely up to the Department of the Interior.
>
> Certain commitments have been made by the private sector in terms of development. I think something in the neighborhood of some $300 million of exploratory development activity

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[16] Interview with Rod Pegues, assistant attorney general, Juneau, July 26, 1977, and Charles Herbert, former Commissioner of Natural Resources, Anchorage, July 13, 1977.

> has already occurred on the North Slope. The companies have recently paid something in the neighborhood of $900 million for additional lease interests.
>
> I believe that there has already been an investment in the neighborhood of perhaps as much as $200 million in connection with the pipeline and related matters, so that in a sense the private sector, at least, has made a decision that this is an important resource which it expects to develop, and this has been a traditional way in which such decisions have been made in this country.
>
> Senator NELSON. I am not raising the question that the oil will never need to be used. I am just raising the question about the timing of it . . . . Now it seems to me we have a situation here where the private sector has made some decisions, but the big controlling decision is still in the hands of the Federal Government, since these are public lands that they had to go across . . . .
>
> Mr. TRAIN. There is no question that the time frame within which we all find ourselves in the problem has been created in substantial part by the timing of the company's own investments and decisions.
>
> I think that whether we would have moved in exactly the same way and created a similar time frame is very much open to question, but that really isn't before use. We are confronted with a situation which exists.[17]

The situation that existed in 1969 was that Alyeska had applied for a right-of-way for a trans-Alaska pipeline project that presented some very difficult environmental and technical problems. At least in part, this was still the case in early 1974 when the project was finally approved. The major difference was that, during the four year delay, substantial progress had been made by Alyeska and government agencies, particularly in resolving technical problems affecting the physical integrity of the line. Also during that time, all affected government agencies, including fish and wildlife, had to assume roles and responsibilities consistent with implicit and explicit priorities, imposed from departmental and Administration levels, to find solutions to these problems and thereby to improve and facilitate the project as a whole.

This was the context in which fish and wildlife protection objectives and interests had to find their "proper" place—a place in proportion to, and in some balance with, a myriad of other factors that went far beyond fish and wildlife values. The practical problem before the fish and wildlife agencies was thus to accommodate themselves to events, structures, and decisions in which they had relatively limited roles, and then to make the best of the limited resources of time, money, and expertise available in helping make the project more acceptable and potentially less damaging to Alaska's environment.

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[17] U.S. Senate Committee on Interior and Insular Affairs, *Trans-Alaska Pipeline, Hearings*, on the Status of the Proposed Trans-Alaska Pipeline, 91 Cong., 1 Sess., October 16, 1969, Part 2, p. 224.

Chapter IV—Pipeline Planning

The term "pipeline planning" is used here in a broad sense, referring to the process of government-industry relations revolving around the trans-Alaska pipeline system proposal and the many technical, environmental, and legal issues it presented during the pre-permit period. This chapter selectively describes and assesses that process, particularly as it involved fish and wildlife protection activities by fish and wildlife agencies. The focus is on critical points at which fish and wildlife concerns interacted with other elements of pipeline planning through early 1974. These occurred in the context of routing and alignment decisions, design review, development of stipulations, preparation of the environmental impact statement (EIS), conduct of pipeline studies, and the process of organizing the Alaska Pipeline Office (APO) and the Joint Fish and Wildlife Advisory Team (JFWAT). Each of these will be dealt with in this chapter, following a general discussion of the nature of the pipeline planning process.

Planning: Responses to Uncertainty

Russell Train recalls that when he initially addressed the trans-Alaska pipeline project as Under Secretary of the Interior in 1969, he "was groping, and had little experience with this sort of thing, nor did anyone in the department." Moreover, there was no money in the department budget for the activity, and no one knew quite how to deal with the budgetary problem. And the oil companies themselves appeared to him to be "a bit lost" and "naive," especially lacking an appreciation of the problems posed by Alaska's arctic and sub-arctic environment.[1] Another federal official, who played a key role in the Bureau of Land Management's (BLM) Alaska state office during the early planning period, similarly recalls how "massive" and "unbelievable" the task became, emphasizing the difficulties of learning to work with Alyeska officials who "didn't even want to do a project design as a preliminary step."[2]

Suggesting more basic constraints on planning by government and Alyeska, the state pipeline coordinator, at a congressional committee hearing in early 1975, assessed the effects of the court injunction that blocked pipeline construction between 1970 and 1973:

> . . . As we see it, the interpretation of this injunction by attorneys of the Department of the Interior and Alyeska curtailed formal and open substantive dialogue between Alyeska's technical staff and their counterparts in the Department of the Interior's review group. This constraint, as well as funding limitations which inhibited formation of a centralized Federal focal point for pipeline matters until signing of the grant right-of-way, limited the opportunities for the designers and Federal reviewers to arrive at final resolutions of basic environmental and engineering differences and to reach agreement on application of the proposed stipulations. In fact, this delay from April 1970 until November 1973 had largely the opposite result from that sought by the environmental organizations; namely, that the delay could not be effectively used for the timely solution of the basic environmental and technical questions faced by the involved parties in this project.[3]

Regardless of this interpretation of the injunction, the period of delay nonetheless did provide essential time to address basic environmental and technical questions presented by the project. But another recent assessment of pipeline planning suggests that, for their own reasons, the oil companies themselves failed to take advantage of the time available:

> Although [the TAPS owner companies] created [Alyeska] to plan and construct the pipeline, Alyeska's officers recognized they lacked necessary planning and construction management expertise .... It was not until late 1973—with construction scheduled to start within four months—that Bechtel was brought onto the project and a semblance of effective, albeit belated, planning began.[4]

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[1] Interview with Russell Train, Washington, D.C., August 25, 1977.

[2] Interview with Gerald Zamber, BLM, Anchorage, May 16, 1977.

[3] U.S. House of Representatives, Committee on Interior and Insular Affairs, *Oversight Hearings on Construction of Trans-Alaska Pipeline*, before the Subcommittee on Public Lands, 94 Cong., 1 Sess., Anchorage, Alaska, February 12, 1975, p. 59.

[4] Terry F. Lenzner, *The Management, Planning and Construction of the Trans-Alaska Pipeline System*, Report to the Alaska Pipeline Commission by the Commission's Special Counsel, August 1, 1977, pp. 1-2. The report goes on to suggest that Alyeska's owners decided to delay a serious planning effort so that they would not appear overly committed to a project subject to rigorous environmental constraints yet to be imposed by government.

Whatever weight one gives to these factors and perceptions, it is clear that the trans-Alaska pipeline system (TAPS) project as a whole was pervaded with technical and environmental uncertainties, and that, as the delay wore on, its very authorization became doubtful because of support for a Canadian alternative and the continuing National Environmental Policy Act (NEPA) challenge. Interior-BLM's response to uncertainty was to push ahead with "planning," which meant extracting and reviewing progessively refined plans and designs from Alyeska; conducting or coordinating technical and environmental studies; approving permits for pre-construction survey work, mobilization, and other activities by Alyeska; developing stipulations; preparing an EIS; and numerous related tasks. The pipeline division, with the assistance of the Technical Advisory Board and USGS-based working groups, had to contend with increasingly complex technical-engineering problems, necessarily taking the basic TAPS proposal before it as a given. The project was a department priority, and it was the division's responsibility to follow through and to contend with the technical problems as they arose. It was not the division's responsibility to question whether the line should be built, but to assist in assuring the safest possible line assuming that it would be built.

By the end of 1969, this primarily meant solving technical-engineering problems, which was also considered the key to solving the biggest environmental problems. Under Secretary Train stated the department's view at a senate hearing in October 1969: "I believe that within the Department we are satisfied that the problems that remain outstanding will be resolved either by engineering design of the pipeline itself, by its particular profile being above or below ground, or in the final analysis by shifting the [trans-Alaska] route."[5] Train was referring primarily to permafrost, seismic, river crossing, and, to a lesser extent, big game movement problems, all of which had at least surfaced by the time he appeared before the committee. These and related problems confronted the new pipeline division established by BLM in Alaska at the end of 1969, and they defined its priorities for most of the next four years.

When it became apparent that government could not simply assume that Alyeska would assure a soundly-engineered product on its own, it became necessary for government to give priority to solving design and engineering problems and guarding against the potentially drastic consequences of a physically deficient line. One result of this was that the subtler and less dramatic environmental effects of pipeline construction—including erosion, stream siltation, fish passage, and similar problems of special concern to the fish and wildlife people—seemed less significant and of lower priority than they might otherwise have been. This conclusion is at least suggested by the attention that such problems first received in 1969[6] compared with engineering and design preoccupations of Department of the Interior (DOI) staff in the following years.

BLM-Pipeline Division

The pipeline division was an attempt to organize a planning process that would be responsive to the growing scope of the project.[7] It was established primarily as a surveillance organization that would review Alyeska's plans and activities rather than assume basic planning responsibilities. The division would consist both of "resource men," mostly with BLM experience, as well as of engineers, one of whom would head the organization. It would be an interdisciplinary team, including some fish and wildlife biologists and other applied scientists, who would analyze Alyeska's plans and project requirements from their several perspectives, and then formulate a consistent position, which would be conveyed to Alyeska in a single, authoritative voice by the chief of the division. To rationalize government involvement as much as possible, the division, at Alyeska's urging, would attempt to coordinate the work of all of the other federal agencies in Alaska having various review, permitting, and other responsibilities affecting the project.

All of this did not work out as planned, of course. In the first place were the inhibitions on both government and Alyeska officials caused by the court suit and other legal delays and the reluctance of congressional appropriations committees to fund the division to requested staffing levels.[8] The staff complement for the interdisciplinary process remained limited and was weighted toward the engineering profession and the more conventional BLM resource management staff. The division and other elements of DOI found it necessary to take an active part in pipeline design activities rather than just reviewing Alyeska's work. As the pipeline alignment was being specifically located in 1970, relations between BLM and the fish and wildlife agencies began to become strained.[9] And Alyeska's desire for a single point of contact did not fit the realities of multiple agency jurisdictions, particularly in government review and permitting of large development projects.

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[5] U.S. Senate Committee on Interior and Insular Affairs, *Trans-Alaska Pipeline Hearings*, on the status of the Proposed Trans-Alaska Pipeline, 91 Cong., 1 Sess., Part 2, October 16, 1969, p. 120. Also, at the congressional oversight hearing in early 1975, a year after construction had started, Charles Champion, state pipeline coordinator, observed, "We are convinced that the major environmental issues have been basically resolved during the design and project permissions phase, which is essentially in its final stages. The Government's role should now be one of sufficient monitoring to assure that the agreed-upon criteria are met." (House Committee on Interior, *Oversight Hearings*, pp. 60-61.)

[6] See, for example, Memorandum from Assistant Secretary for Fish and Wildlife, Parks, and Marine Resources to members of North Slope Task Force, Subject: "Proposed Action Program," April 30, 1969; also, the July 1969 and September 1969 drafts of the environmental stipulations.

[7] The following description of the pipeline division is based on interviews with several former BLM-division officials: Burton Silcock, Anchorage, May 11, 1977; Gerald Zamber, Anchorage, May 16, 1977; James Hemming, Anchorage, July 12, 1977; Morris J. Turner, Anchorage, August 16, 1977; and Henry Noldan, Washington, D.C., August 21, 1977.

The pipeline division nonetheless moved along a step at a time, discharging its tasks as best it could under the circumstances. The Alaska-based aspects of the project were under its care, and division staff kept a focus on the trans-Alaska proposal that industry continued to develop with the division's participation and prodding during the years of delay.

Significant changes in the pattern of these planning activities have already been noted. First was the shift from the generalized land and resource protection concerns reflected in the 1969 stipulations to an emphasis on specific engineering and technical problems and stipulations in 1970 and after. Second was the intervention of Washington DOI officials in early 1971, after the first draft of the EIS was found inadequate, and the establishment of department level EIS preparation and stipulations review groups. One result of these changes was that fish and wildlife agencies in Alaska had less opportunity to play active and direct roles in the planning process than they had had in 1969 and 1970. The head of the pipeline division in the meanwhile had become part of the Washington-department level planning structure, serving as a member of the Technical Advisory Board and of the Menlo Park Working Group, and Chairman of the Stipulation Revision Group.

There was, however, no apparent reduction in the volume of work handled by the pipeline division. Division staff participated with representatives of other agencies, including FWS, in producing sections of the new EIS for the "102" task force in Washington; continued work on the stipulations; reviewed Alyeska's project description submitted to DOI in mid-1971; conducted preliminary design reviews of Alyeska's plans for facility locations, material sites, above and below ground modes, and related design elements; and coordinated environmental data collection efforts in which several federal and state agencies participated throughout the planning period.

Alignment: The Gulkana-Gakona Case

The trans-Alaska route was essentially the oil companies' choice, and BLM worked with industry representatives during the winter of 1968-1969 in determining particularly the route to be followed through the Brooks Range.[10] Later, in the interagency review of specific alignments, the fish and wildlife participants began raising objections. One of the first and most important occasions concerned the Gulkana-Gakona River drainage re-route issue, which FWS officials characterize as "precedent setting," the "outstanding river re-route case," and one in which "the battle lines were drawn" and FWS lost.[11]

The issue reached the department level in early 1970, after FWS staff in Alaska had unsuccessfully recommended a change in route (from the Gulkana River to the Gakona River drainage) in order to by-pass a highly productive salmon spawning and sport fishing area in the Copper River Basin. The Assistant Secretary for Fish and Wildlife, Parks, and Marine Resources then appealed to the Under Secretary:

> The desirability of a route change in the TAPS pipeline in order to avoid the upper Gulkana River watershed, including the Paxson Lake area, has been a subject of much discussion . . . .
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> . . . .
>
> We believe that the proposed route change is one of the major considerations in the pipeline routing—excepting the integrity of the pipeline itself.[12]

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[8] At the end of 1970, the division had 25 personnel and a planned staff level of 70, which was never reached. When the Trans-Alaska Pipeline Authorization Act became law in late 1973, the division still had only 18 professional level staff. (U.S. Department of Interior, Bureau of Land Management, *Surveillance of the Proposed Trans-Alaska Pipeline System*, 1970 Annual Report, Anchorage, Alaska, 1971, p. 9; and U.S. Department of the Interior, Bureau of Land Management, Alaska State Office, Division of Pipeline, *Trans-Alaska Pipeline Project: Administration and Management Summary*, October 1973, Appendix H.)

[9] Interviews with Burton Silcock, former state director, BLM, Anchorage, May 11, 1977; and Gerald Zamber, BLM, Anchorage, May 16, 1977.

[10] Interview with Burton Silcock, former state director, BLM Anchorage, May 11, 1977.

[11] Interviews with FWS officials, May, June, and August, 1977.

[12] Memorandum from Assistant Secretary for Fish and Wildlife, Parks, and Marine Resources to Under Secretary, Subject: "Pipeline—Suggested Route Change on Upper Gulkana River," February 2, 1970.

By mid-1970, FWS was forced to back down. BLM had argued that soil stability factors, together with use of existing terrain features and additional control structures, clearly made the Gulkana the safer route, while the TAPS companies claimed that "their contingency plan for the Gulkana section would be their showpiece of good planning and the first developed."[13] The FWS officials acknowledged that they "lacked specific data to refute [BLM's] assertions since they were presented as an engineering solution to our problem."[14] Futher, the Gakona route would have required two crossings of the Copper River, a major water course, as opposed to the several smaller tributaries affected by the Gulkana route. As a result, the FWS officials agreed to accept the assurances of BLM and the TAPS companies, providing that they could review and comment on both construction and oil spill contingency plans for that segment of the project.[15]

This, however, did not end the controversy. FWS and National Marine Fisheries Service (NMFS) staff saw no contingency plans until 1977, since the stipulations did not require such plans until 180 days before "start-up," i.e., the date when oil started flowing through the line. Also, the construction plans before 1974 were preliminary only, and did not provide definitive designs for agency review. Consequently, at least until the end of 1972—two and a half years after the conditional agreement to go with the Gulkana route—FWS staff felt it necessary to keep the issue alive, still viewing the Gakona re-route as "the only feasible alternative."[16] But, despite their continuing interest and their attempts to hold BLM to the initial agreement for review before construction started, they were frustrated by the complexities and discontinuities of a planning process over which they had little control.[17]

This episode is not a representative case of alignment review, if any such case exists.[18] It is summarized here because it was referred to repeatedly in interviews with FWS staff, and it seemed to symbolize to them their secondary status in pipeline planning with BLM, Alyeska, and the engineers who held prominent positions in both of these organizations. Further, it illustrates recurrent difficulties that biologists had in communicating with engineers throughout the pipeline planning and construction phases, and it suggests the problems the biologists had when either they lacked pertinent data or their data did not mesh with that of the engineers.[19]

Finally, the case provides some insight into DOI's pipeline planning structure. When serious differences arose between agencies and appeals were made to higher levels, such as in this instance, the Secretary's office acted as the final arbiter. At the working level in Alaska, BLM's pipeline division combined the roles of lead agency working directly with Alyeska, coordinator of interagency involvement, and first-level "arbiter" of differences and disputes. The chief of the division, however, at least during the two to three year period spanned by this case, was not required to report to higher levels through the state and national directors of BLM; he had direct access to the Under Secretary's office, where department disputes and appeals were generally resolved.[20] This suggests the real authority of the pipeline division within the department at the Alaska level, and its advantageous position when differences with FWS had to be resolved at higher levels.

The structure of the planning process reflected department priorities and accommodated the basic function of the pipeline division: to attempt to balance and accommodate a variety of interests, including fish and wildlife protection, while proceding as consistently as possible toward final designs for a soundly engineered (and presumably, therefore, environmentally safe) trans-Alaska oil pipeline.

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[13] Memorandum from director, BSFW and director, BCF to Assistant Secretary for Fish and Wildlife and Parks, Subject: "Suggested Route Change of TAPS Pipeline Around Upper Gulkana River," July 6, 1970.

[14] Ibid.

[15] Ibid.; also Memorandum from regional director, BCF, Juneau, to state director, BLM, Anchorage, Subject: "TAPS Pipeline Route near Paxson-Summit Lake Area," July 9, 1970.

[16] Personal communication with FWS official, Anchorage, October 11, 1977.

[17] See Memorandum from regional director, BCF, Juneau, to chairman, executive committee, Interagency Fish and Wildlife Team, Subject: "Review of Pollution Contingency Plans for Trans-Alaska Pipeline" March 12, 1971; and U.S. Fish and Wildlife Service, BSFW, "A Report on Comparisons of the Fisheries Resources Along Proposed and Alternative Pipeline Routes between Isabel Pass and Willow Lake," Anchorage, Alaska, September, 1972.

[18] It was not possible to document and analyze, within the scope of this research, the fish and wildlife-related alterations that were made in the pipeline alignment and in the locations of related facilities. Two wildlife biologists have pointed out that "on the basis of the preliminary fish and wildlife investigations the planned locations of construction camps, airports, pumping stations, communication sites, gravel pits and access roads were in some cases modified to minimize direct impacts to fish and wildlife. This included moving communication sites away from raptor nesting cliffs, rerouting of the pipeline and haul road away from mountain sheep lambing areas and fish spawning areas, and location of gravel pits where impact on fisheries could be minimized or to enable the abandoned pits to be flooded and developed for fisheries production." (David R. Klein and James E. Hemming, *Resource Development and Related Environmental Problems in Arctic Alaska—Impact on Fish and Wildlife*, Paper presented at XXIII International Geographical Congress, Leningrad, U.S.S.R., July 1976, p. 3.)

[19] In this case, however, there was disagreement between the fisheries biologists and some of the wildlife biologists. The latter preferred the Gulkana route because it required less elevated pipe and therefore posed less a barrier to moose and caribou in the area. It also avoided certain lands used by moose and caribou that would otherwise be affected by the Gakona route. (Interview with Norval Netsch, FWS, Anchorage, June 8, 1977 and personal communication with James Hemming, JFWAT, Anchorage, October 11, 1977.)

[20] Interview with Henry K. Noldan, former official of BLM pipeline division, Washington, D.C., August 21, 1977.

Design Review

The TAPS companies gave early indications that they did not have answers to basic design problems, and there were serious doubts at first that they were even aware of the most critical problems. The outstanding instance was their plan to bury all but about 40 or 50 miles of a line that would cross 800 miles of a region mostly underlain with permafrost. And this decision had been made on the basis of a very limited core soil sampling project, which was expanded only after DOI forced the issue. USGS then brought the construction mode (above ground-below ground) problem to a sharp focus through its permafrost studies.[21] But as critical and dramatic as this issue was, it was still only a symptom of a larger problem that would persist throughout the planning period: Alyeska's inability to develop acceptable design criteria except under the continuous pressure of the government monitors, who themselves had to assume part of the burden of developing such criteria.

The following sequence of events in 1970 suggests the nature of the design problems and especially of the process of attempting to resolve them:

> Alyeska Pipeline Service Company presented their design parameters for the Copper River Basin section of the pipeline [at a Menlo Park meeting on February 20.]
>
> After thorough study of the material submitted by [Alyeska], the working group reconvened on March 17 through March 19 to discuss technical aspects of the data. It was the consensus of the group that much of the information furnished seemed to summarize preliminary studies and did not present sufficient data for sound generalizations, particularly applicable to a bury, no-bury decision ....
>
> [Alyeska] and the Technical Advisory Board working group met again on April 14-16 to discuss and clarify questions raised by [Alyeska] in interpreting the working group's previous comments.
>
> [Alyeska's] informal response to the working group's comments was made available for evaluation in mid-October. A team of BLM personnel, encompassing civil, structural, mechanical, hydrology, geology, and soil mechanics disciplines conducted a concentrated review of material available. Comments were prepared and introduced at the working group meeting which was convened November 12, 1970. Subsequent to the November 12 meeting, technical stipulations were drafted in Washington on November 16-18 and reviewed with [Alyeska] on November 19. The technical stipulations were reworked and rewritten on December 15, 1970 and submitted to [Alyeska] on December 16, 1970
>
> A formal submittal of criteria data, made by [Alyeska] at the year's end, will be reviewed in the ensuing year.[22]

The chief of the pipeline division, who was also a member of the Technical Advisory Board and the Menlo Park Working Group, in mid-1973 referred back to this period, commenting first that "Since my involvement ... on the proposed trans-Alaska pipeline (some 40 plus months now) Alyeska has been striving to set [design] criteria acceptable to Interior." He then discussed the November-December phase of the 1970 meetings:

> In November 1970, a government/industry meeting was held in Menlo Park, California. At that time, because of the failure of industry to come up with acceptable design criteria (geotechnical and other problems peculiar to the subarctic and arctic), [USGS Director] Pecora directed that the Menlo Park Working Group and the Technical Advisory Board provide guidance in this matter. This was done and standards were set ...[23]

The "standards" referred to took the form of technical stipulations, which in significant part are a direct outgrowth of government's dissatisfaction with Alyeska's attempts to develop acceptable design criteria responsive to "geotechnical and other problems peculiar to the subarctic and arctic."

Plan, design, and construction procedure review problems from the large to the small persisted throughout the 1970-74 period, although the review process improved significantly with time.[24] But the early days appear to have been particularly frustrating, probably as much for TAPS officials as for BLM, as both government and industry attempted to organize themselves in-house as well as rationalize their relationships with each other. In May of 1970, for example, the state director of BLM chastised the TAPS organization:

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[21] This problem attracted much attention at public hearings conducted by DOI in Fairbanks in August of 1969, and was emphasized by Under Secretary Train at congressional hearings in October. (Interview with Russell Train, Washington, D.C., August 25, 1977; Senate Interior Committee, *Trans-Alaska Pipeline, Hearings*, pp. 81-125.) USGS, of course, was not alone in warning of permafrost hazards. Scientists and engineers at the University of Alaska, the Naval Arctic Research Laboratory, and the Cold Region Research and Engineering Laboratory (CRREL), among others, also alerted DOI officials and pipeline planners to the problem.

[22] BLM, *1970 Annual Report*, p. 43.

[23] Memorandum from Morris J. Turner, member, Technical Advisory Board, to Deputy Under Secretary, Office of the Secretary, Subject: "Comments in Response to Request by Ed Patton, Alyeska, Reference:—Design Criteria," June 13, 1973.

[24] Ibid.; also, interview with Julius Rockwell, staff fisheries biologist, APO, Anchorage, July 12, 1977.

> Generally, the document review of your plans has [followed] rather than preceded [your work] effort. As examples, we did not receive the plans and specifications for the road design until after you had received bids. Similarly, this was the case with your first attempt at contracting for the pipeline. Most recently, we had experienced a similar situation in the pipeline survey contract. Our job can best be accomplished by reviewing these documents and working with you in advance of when you become contractually obligated.
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> ……
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> Your personnel have done an excellent job in the [haul] road mobilization, yet it is our impression that the road is operating as an independent entity outside of the purview of the pipeline and the pump stations considerations. Your road engineering firm does not appear to be concerned with where the pipeline ultimately goes ....[25]

Haul road design and general construction procedure review problems were discussed again by BLM-pipeline division and Alyeska officials in Houston, Texas, in October 1970.[26] The chief of the division (then called the "project coordinator") subsequently reported that "although the meeting was beneficial ... we did not receive data in sufficient detail to pass any judgements as to acceptability ...." And with special reference to data needed for assessing environmental impacts, he observed that:

> This cannot be assessed until documents ... are available for review. For example:
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> 1. Until elevated construction is located, we cannot assess its effects on game movements.
> 2. Until stream crossing profiles are provided and construction techniques are finalized, we cannot assess [their] effects on rivers and fish.
> 3. Until construction techniques are provided and sources of materials are determined, we cannot assess the effects on stream characteristics, effect on fish, effect on forage for animals and erosion.
> 4. Until alignment is finalized, drainage patterns cannot be checked for effect on the pipe.
> 5. Until final design is provided, we cannot assess the effects on the recreation potential of the area.[27]

These comments indicate the direct dependence on environmental impact analyses, and especially those aspects of concern to the fish and wildlife agencies, on adequate and complete design and construction data, which were not forthcoming at the time. And it was during this very period that the pipeline division was attempting to prepare an adequate first draft environmental impact statement. Moreover, most of the above listed items were either not completed, or completed in only a generalized and preliminary fashion, until after the stipulations were essentially in final form, the final EIS had been prepared, the right-of-way permit was issued and construction was underway.[28]

Variations on these design-environmental data problems thus appeared repeatedly during the next three years and beyond. Review procedures prompted a Washington-level meeting of an interagency technical advisory group in mid-1972, two months after the Secretary of the Interior had issued the final EIS and announced his intention to grant the pipeline right-of-way permit. In calling the meeting, the Deputy Under Secretary (who also served as executive secretary to the Task Force on Alaska Oil Development) noted that Alyeska "has requested that we develop procedures to be followed in the pre-construction and construction stages." The group was charged with (1) identifying the kinds and amounts of data required for design review and (2) developing procedures for assessing such data.[29] This, it should be noted, was two and a half years after the pipeline division had initiated basic design review activities, although in a very preliminary way, with TAPS-Alyeska.

In May 1973, as Congress was considering the right-of-way and pipeline authorization legislation, the Under Secretary called a meeting of the Federal Task Force on Alaska Oil Development, which he chaired, noting that he was "hopeful that a compromise bill can be adopted by the end of the summer." On the subject of design review, he observed that

> The companies face the practical problem of whether to keep their engineering team together in order to complete design of the pipeline, even though construction may not begin for a year to a year and a half, or whether to disband their engineering team now and complete design after a permit has been cleared through Congress and the courts. They prefer to complete the design now, ...
>
> This will require ... that the Task Force consider and reach preliminary agreement on design criteria in certain areas that have heretofore been the subject of concern and debate: seismic criteria, stress criteria, valve locations, river crossings and flood plains, construction pad criteria, and methods of elevating the pipe; .... The companies have submitted detailed materials on the first three of

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[25] Letter from Burton Silcock, state director, BLM, to David Henderson, Trans-Alaska Pipeline System, Anchorage, Alaska, May 11, 1970.

[26] Memorandum report of Morris J. Turner, project coordinator, on "Road Designs and Construction Procedure Review: Houston, Texas, October 7 through 9, 1970." Turner noted in his report that "we have had no reply to date" to the comments on the haul road included in the May letter quoted in part above.

[27] Ibid.

[28] See Chapter VI below for discussion of the design review process during the construction phase.

[29] Memorandum from Jared Carter, executive secretary, Federal Task Force on Alaska Oil Development, to [interagency group], Subject: "Trans-Alaska Pipeline—Pre-Construction and Construction Procedures," July 12, 1972.

> these subjects and informal interagency meetings have been held in Alaska to discuss some or all of them.[30]

The Technical Advisory Board of the task force met in July 1973 and reported its "conclusions" on two of the above sets of criteria with the following circumlocution: "Design criteria (pipe stess and seismic design) were discussed, and to the extent that we are informed of Alyeska's work, we see no reason why their final designs would not be acceptable if good engineering practices are applied to these two criteria."[31] And in December 1973, just weeks before the federal right-of-way permit was granted, a meeting of government and industry officials was held in Houston to discuss river crossing and flood plain and above ground ("methods of elevating the pipe") designs, topics of special relevance to fish and wildlife agency interests. The chief of the pipeline division summarized the views of the federal and state representatives:

> Although we do not agree completely with all of the proposed designs, we believe that, in general, they have merit and represent an improvement over those previously reviewed. Final evaluation of the proposals must await more specific descriptions of the proposed actions and review of supporting documents when they become available.[32]

Less than one month earlier, an interagency "check point" meeting was held in Anchorage to assess project information recently submitted by Alyeska. Among those attending the meeting were federal and state fish and wildlife agency officials who had special interests in at least two of the topics under review, streams and flood plains and construction modes (above-below ground design). On stream crossing designs and construction procedures, the fisheries-oriented representatives at the meeting found that "specific details upon which ... judgements could be based were not included [in the Alyeska materials]," and they went on to cite a lengthy list of data deficiencies relating to field construction timing, methods of installation, identification of streams, and similar matters. Concerning the effect of elevated pipe on big game movements, a wildlife group acknowledged the need for extensive above ground segments because of unstable soils, but found several alignment areas where they felt that designs were not adequate to accommodate big game.[33]

Stipulations

The first draft of environmental and general stipulations, completed in July 1969, was the product of an intensive interagency effort, centered in BLM's Alaska state office. A second draft was issued shortly after a public hearing was held in Fairbanks in August. This early period was the high point of fish and wildlife agency participation in stipulation development.[34]

Initially, BLM's intention was to write rather specific stipulations that would guide and restrict pipeline construction affecting the land, water, and "living resources" of the corridor, but, as pointed out by the BLM official who was then the leader of this effort, this was impractical because "we didn't know what we were dealing with."[35] What he meant was that, first, pipeline alignment, design, and construction modes and procedures were not developed in sufficient detail to permit anything approaching specific stipulations. A major problem in writing the stipulations, then, was that TAPS provided too little to go on; "they said they would design it as they went."[36] Second, information about the environment potentially affected by the pipeline was sparse at best, and certainly not adequate to assess specific sites along an alignment that was itself still subject to significant shifts. So the stipulations had to be very general, taking the form of broad standards rather than a specific set of "do's and don'ts." And this, in turn, meant that substantial discretion would need to be allowed the officials who would ultimately enforce them.

Technical stipulations were added to the environmental and general provisions in 1970; they were a product of the series of industry-government encounters over design problems discussed above. The TAPS people had shown from an early point that they had not begun to master permafrost, earthquake, and flood plain and river crossing construction problems. This was first evidenced in their answers to pertinent sections of the "79 Questions" that Under Secretary Train had posed to them at the same time TAPS submitted its original application in June 1969. It was further evidence by the "13 Questions" prepared by USGS in March 1970, and over which the TAPS engineers struggled for the rest of that year. The chairman of the Technical Advisory Board, who was also director of USGS, finally decided in November 1970 that government should take on the task that Alyeska was not performing adequately: the development of criteria and stipulations covering seismic, mode selection, construction, and related technical problem areas. The USGS Menlo Park Working Group quickly responded, producing the first draft before the end of the year.[37]

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[30] Memorandum from John C. Whitaker, chairman, to Federal Task Force on Alaska Oil Development [and others], May 23, 1973.

[31] Memorandum from chairman, Technical Advisory Board, to chairman, Federal Task Force on Alaska Oil Development, Subject: "Technical Advisory Board Meeting held on July 19, 1973," July 20, 1973.

[32] Memorandum from Morris J. Turner, chief, Division of Pipeline, BLM, to technical advisor, Office of the Secretary, Department of the Interior, Subject: "Draft Memorandum of Discussions of Flood Plain and Above Ground Design held in Houston, December 12 and 13, 1973," December 21, 1973.

[33] "Memorandum of Record, check point meeting of November 19-20, 1973," (BLM draft) and attached report "Group I, Environmental Factors," pp. 8-14.

[34] Interviews with Gerald Zamber, BLM, Anchorage, May 16, 1977; Burton Silcock, former BLM state director, BLM, Anchorage, May 11, 1977; and Kenneth Roberts, NMFS, Washington, D.C., August, 24, 1977.

[35] Interview with Gerald Zamber, BLM, Anchorage, May 16, 1977.

[36] Ibid.

With the shift of attention from the environmental to the technical stipulations in 1970, FWS and other fish and wildlife agency participation in the development of stipulations was correspondingly limited. But this did not end FWS concern about the environmental stipulations.[38] FWS officials were especially concerned that these stipulations gave too much discretionary authority to the authorized officer, and that they did not assure sufficient protection of the fisheries. These concerns flared up in August 1971, as the final EIS was being drafted and the stipulations were being revised for issuance with the EIS.[39]

FWS officials in Alaska informed FWS-Washington that they had strong objections to the environmental stipulations, and they proposed some 70 changes in substance and wording. These were "screened" by Washington FWS officials, who then proposed about half that many changes to the Stipulations Revision Group. This group was headed by the chief of the pipeline division, who many thought would be the authorized officer for the construction phase. Also comprising the group were two additional technical-engineering experts and a lawyer from Interior's solicitor's office. (This group was formed principally to deal with issues affecting the technical stipulations, as discussed above, but had authority to approve or disapprove proposals affecting all stipulations; this authority was concentrated in its chairman.) The group approved of some relatively limited and minor changes among those proposed by FWS, and a last round of further reviews and comments was conducted before the stipulations were issued in essentially their final form in February 1972.[40]

FWS officials continued to press for changes in the environmental stipulations after the February draft was issued with the final EIS in March 1972, but they were unsuccessful. Those who were directly involved in these efforts tend now to concede, at least in retrospect and with some qualifications, that more specific and restrictive stipulations might have been very difficult to apply, given the many uncertainties involved in the construction process and the lack of site-specific environmental information. Thus, their major concern was with how effectively the stipulations would be enforced and who would exercise the extensive discretionary authority built into them. Their hope in the end was that FWS would have independent authority to monitor compliance with the fish and wildlife-related stipulations, and to shut down construction operations where serious violations occurred. Although this was not to be, the stipulations nonetheless provided fish and wildlife agencies with substantial leverage in the surveillance process and, reinforced with certain independent statutory authorities for fish and wildlife protection, this leverage was exercised primarily through JFWAT during the construction period.[41]

Environmental Impact Statement

The first draft of the EIS issued in early 1971 met few if any tests of adequacy. There was little disagreement among DOI officials, whatever their specific agency loyalties, that a new product was necessary.[42] The initial draft was one of the first, if not the first, major EIS documents attempted after the National Environmental Policy Act (NEPA) became law at the beginning of 1970. There were, therefore, no adequate precedents, experience, or guidelines, and this would still be the case in 1971 when the final draft was prepared.[43] But since an EIS was now a statutory prerequisite to government authorization of the pipeline project, it was essential that an "acceptable" document be produced. The Secretary's Office placed a high priority on preparation of a final EIS, designating an official of USGS to head an interagency "102 Statement" task force.[44]

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[37] See discussion of these events above. This summary of how the technical stipulations were developed is also based on interviews with Zamber and Silcock noted above; also, interviews with Morris J. Turner, APO, Anchorage, August 3 and 5, 1977, and Arlan Kohl, APO, Anchorage, June 9, 1977.

[38] The following discussion is based on interviews with Gordon Watson, FWS, Anchorage, May 19, 1977; Norval Netsch, FWS, Anchorage, June 8, 1977; LeRoy Sowl, FWS, Anchorage, July 7, 1977; Henry Noldan, BLM, Washington, D.C., August 21, 1977; and Kenneth Roberts, NMFS, Washington, D.C., August 24, 1977.

[39] Interview with Kenneth Roberts, NMFS, Washington, D.C., August 24, 1977.

[40] An official very close to this process, which was concentrated in the final months of 1971, stated that "everything was done in a rush," and he judged that "probably five percent of what FWS wanted [at that time] was incorporated into the stips."

[41] See Part 3 of this report.

[42] A top BLM official commented that the EIS draft was about the first one ever written, and "we didn't know what to do." A FWS official, who participated in writing it, admitted that "We weren't very objective at all on the first draft," and that it had a "rape, pillage, and plunder" tone. And a former FWS official said that it was "totally preposterous."

The "environmental issue" was now a NEPA question, and responsibility for the EIS passed from BLM-Alaska to the department level. Under the task force structure, however, FWS and NMFS officials in Alaska were designated to prepare the "living resources" sections of the EIS under the general supervision of a FWS editor in Washington.[45]

The final EIS, a six-volume report, together with a three-volume analysis of the economic and security aspects of the pipeline proposal, was issued by DOI in March 1972. The department's press release emphasized that the document was massive, complex, and thorough, and that it was the product of extensive study, hearings, and interagency participation "requiring 175 man-years of work in the year since March 1971."[46]

The EIS ultimately succeeded in fulfilling its primary function, which was to meet NEPA requirements, in this case to the satisfaction of Congress as it deliberated on the Trans-Alaska Pipeline Authorization Act. In reporting out the legislation in July 1973, the House Interior Committee referred to the EIS as "the most comprehensive and exhaustive analysis that has been prepared for any project. It was prepared not by the Department of the Interior alone, but by an inter-departmental team with a wide range of inter-disciplinary skills. Its cost is estimated to be in excess of $7,000,000 . . . ."[47]

It should be recalled, however, that the final EIS was written with much less than complete or definitive information about either the project or the environment.[48] The Washington FWS editor of the "living resources" sections of the document feels that the writers "probably" had sufficient information for "general predictions" but certainly not for site-specific analysis and predictions.[49]

David L. Brew, the USGS official who headed the 102 Statement Task Force, subsequently discussed the relationship between information and decision making in the following terms:

> . . . The information available about a pipeline or any other project varies with time, from a relatively low level in the conceptual stage to a high level in the final construction and operation stages. Depending on the project, its location, the types of impacts possible, and other factors, the pertinent environmental information may or may not follow a similar path. The determination that the available environmental information is adequate in scope and quantity to constitute an element in the decision process depends mainly on the value framework of those responsible for the decision. As environmental awareness and conscience develop, certain critical elements of environmental information should become acknowledged as requirements for just decisions, in the same way that predicted cost and profit data are now universally accepted as critical factors in the analysis of economic feasibility.[50]

Brew seemed to be implying here that, in the future, stricter standards were likely to be applied in environmental impact analysis than were actually applied in this case. His meaning became clearer in his next paragraph:

> In the case of the proposed trans-Alaska pipeline, policy makers in the Department of the Interior decided that the available environmental information was adequate for impact analysis. *This was determined before the environmental data had been compiled*, and it is therefore questionable to what extent the amount of environmental data actually available influenced the decision to proceed [emphasis added].[51]

Finally, Brew observed that "the baseline environmental information available at the start of the impact analysis was approximately comparable in quantity and quality to data available on the proposed pipeline project."[52] In the light of our previous discussion of the design review process and the project data problem, particularly as early as 1971 when the EIS was written, this could not have been too reassuring to government analysts.

Preparation of the EIS appears to have been a diversion from the main line of pipeline decision making at the policy level. It was primarily a response to a statutory requirement that had to be met before the project could proceed. Since the EIS was written after the environmental stipulations were essentially completed, and because awareness of the basic problems to which the stipulations were directed (erosion, siltation, fish passage, big game passage) did not depend on information from the EIS, the EIS could have had little effect on the stipulations. The FWS editor of the "living resources" sections of the EIS states that there were no changes in the pipeline alignment as a result of the information and analysis contained in these portions of the impact statement.[53] Perhaps the EIS requirement did force Alyeska to accelerate preparation of a project description, but it is not evident that the EIS, per se, substantively influenced project designs.

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[43] Interview with David Grayson, office of the Solicitor, DOI, Washington, D.C., August 25, 1977.

[44] Memorandum from Jack O. Horton, Assistant to the Secretary, to [agency heads], Subject: "TAPS 102 Statement," February 3, 1971.

[45] Interview with Kenneth Roberts, former FWS official who served as one of five final editors of the EIS, Washington, D.C., August 24, 1977.

[46] Department of the Interior, "Interior Releases Final Environmental Impact Statement on Trans-/Alaska Pipeline Proposal; No Decision Due Yet," News Release, March 20, 1972.

[47] U.S. House of Representatives, Committee on Interior and Insular Affairs, *Amending Section 28 of the Mineral Leasing Act of 1920, and Authorizing a Trans-Alaska Oil and Gas Pipeline, and for Other Purposes*, Report No. 93-414, to accompany H.R. 9130 93 Cong., 1 Sess.,d July 20, 1973, p. 19.

[48] See David L. Brew, *Environmental Impact Analysis: The Example of the Proposed Trans-Alaska Pipeline*, Geological Survey Circular 695, U.S. Geological Survey, Reston, Virginia, 1974, especially p. 9.

[49] Interview with Kenneth Roberts, Washington, D.C. August 24, 1977.

[50] Brew, *Environmental Impact Analysis*, pp. 10-11.

[51] Ibid., p. 11. For a much stronger statement and critical analysis of this issue, see Henry R. Myers, "Federal Decision-making and the Trans-Alaska Pipeline," *Ecology Law Quarterly*, Vol. 4: 915 (1975), 948 ff.

[52] Brew, *Environmental Impact Analysis*, p.11.

The EIS very likely had other effects, however, that tended to reinforce one of the basic currents of the pipeline planning process: Since there were so many uncertainties and information gaps, which preparation of the EIS helped to emphasize, it followed that the stipulations had to be general and allow a wide range of discretion, with ample waiver authority. In this way monitors would have the flexibility necessary to deal with many unpredictable problems when they arose at the time that project designs were actually implemented and adapted to specific sites in the field. Beyond spotlighting data gaps in knowledge of impacts and fish and wildlife resources, however, FWS and NMFS involvement in EIS writing seems primarily to have served the purpose of helping to clear the way for authorization and construction of the trans-Alaska pipeline.

Fish and Wildlife Information

From an early point in the planning phase, the BLM-Alaska staff was aware of the need for massive amounts of information about both the environment and project as a basis for developing adequate stipulations and related design and construction review criteria. Fish and wildlife agency staffs were eager to respond to the need for information about the distribution and characteristics of fish and wildlife resources.[54]

It was the demand for this information that gave the fish and wildlife biologists and managers their best entry into the pipeline planning process, resulting ultimately in the establishment of JFWAT as a special entity within the construction monitoring system. Further, the four-year delay in pipeline construction provided the biologists with time to close some of the more critical gaps in resource data along the TAPS route. But, given the scale and complexity of the studies required in extensive areas where so little work had previously been done, together with funding and staffing limitations that handicapped the biologists throughout that period, the fish and wildlife information base was far from complete when construction was authorized in late 1973.

By construction time, however, the biologists of FWS, NMFS, ADFG, and BLM had effectively crossed agency jurisdictional lines, formed a close working subgroup within the planning process, and demonstrated the value of their work. They were thus able to sustain their momentum, arguing effectively that now that construction was about to begin, their expertise would be all the more essential in applying what they knew in making judgements about the potential impacts of construction, particularly where hard data on fish and wildlife resources remained inadequate or absent.

In 1969, when it still appeared that a permit would be issued by the end of the year, a group of FWS biologists was assigned to compile data and conduct limited studies of the pipeline route, assess potential impacts, and make recommendations for stipulations. All this was to be done in less than one year's time,[55] even though virtually no fisheries studies had been done north of the Yukon River, and there were still substantial gaps in knowledge of the fisheries south of the Yukon as well.[56] And the more site-specific the information needed—which would be the case in assessing the pipeline alignment, material sites, specific stream crossings, and nesting areas, for example—the greater were the inadequacies in the existing fish and wildlife data base.

A year later, in 1970, as it became apparent that there would be a grace period of indeterminate length before construction, a more deliberately organized cooperative effort was initiated among the handful of biologists working on pipeline studies. BLM's fisheries biologist called together his counterparts in FWS and the Alaska Department of Fish and Game, a group of three who set out in mid-1970 as the "Interagency Fish Working Team" to produce a catalogue of fish streams, giving priority to streams north of the Yukon.[57] By the end of 1970, this coordination effort was expanded and organized into an "Interagency Fish and Wildlife Team" (IFWT), which eventually included representatives of Alyeska and the University of Alaska as well as all federal and state agencies having relevant study and related program responsibilities.[58] The team operated under the general direction of an executive committee chaired by the state director of BLM and consisting of federal and state agency heads and Alyeska and university representatives.

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[53] Interview with Kenneth Roberts, Washington, D.C. August 24, 1977.

[54] See Memorandum of Gerald Zamber, assistant pipeline project coordinator, pipeline division, BLM, to files, Subject: "Meeting with BCF and BSFW on Pipeline Study Coordination," April 24, 1970.

[55] Interview with David Spencer, former FWS coordinator of pipeline studies, Anchorage, June 8, 1977. One of this FWS group, James Brooks, became Commissioner of the Alaska Departement of Fish and Game in 1972.

[56] Interviews with Julius Rockwell, APO, Anchorage, July 7, 1977; Norval Netsch, FWS, Anchorage, June 8, 1977; and Melvin Monson, FWS, Anchorage, May 27, 1977. One of the areas for which adequate information did exist was the Copper River Basin, including the Gulkana and Gakona drainages, where biologists made their major stand in an alignment dispute and lost.

The IFWT was not a formal organization, however, in that it had no budget or staff of its own. It was completely dependent on what individual agencies were able to incorporate into their own pipeline studies programs, the most substantial being those of FWS, NMFS, and BLM. Funding problems were endemic throughout IFWT's existence, right up to 1973 when pipeline authorization was imminent.[59] BLM's fisheries biologist, who was the prime mover of IFWT, in retrospect refers to it as a "bootlegged" effort, and one necessarily aimed only at "broad, quick" coverage of the most critical information problem areas.[60] At both federal and state government levels, it proved difficult to increase agency budgets for pipeline work in the absence or the prospect of a permit. Further, Alyeska was not required to reimburse agencies for their pipeline-related work until after the right-of-way agreements were signed.[61] As a result, most agencies were unable or reluctant to increase funds for environmental studies, and their contributions to the pipeline studies coordinated through IFWT had to be limited accordingly.

Given the comparatively primitive state of knowledge about the hundreds of Alaska streams crossed by the pipeline and related roads, and the requirements for site-specific fish and wildlife data in design review and construction monitoring, it is not surprising that BLM-APO's fisheries biologist would conclude that perhaps only 20 to 30 percent of the "needed" data base was developed during the planning period.[62] This assessment is generally reinforced by BLM-APO's wildlife biologist, who recalls IFWT's "several years [of] sheer panic" in attempting to catch up with information demands, a situation that he feels improved only in 1976, when the pipeline project was already half built.[63] On the other hand, virtually all of the fish and wildlife specialists interviewed about the environmental data base problem believed that the pipeline delay made it possible to develop a much better, if not fully adequate data base, and that for some areas even an "excellent" base was compiled.[64] In any case, much remained to be learned about fish and wildlife resources along the pipeline route during the construction process itself.

In addition to developing information, IFWT also served as a vehicle for transferring information from the fish and wildlife specialists into pipeline design and construction planning work by Alyeska and BLM. IFWT opened channels of communication not only among fish and wildlife biologists and managers in different agencies, but it also provided lines from the fish and wildlife agencies to Alyeska and BLM pipeline division staff. Although the extent to which these lines were used is not clear, the record of IFWT deliberations suggests that there was much interchange of data on stream crossings, big game crossings, and nesting, breeding, and other critical habitat areas, and that much related discussion of design and construction criteria took place among IFWT members.

In the end, IFWT dissolved as construction began in early 1974 and agency staff became absorbed in more immediate pipeline related work. Although individual agencies—FWS and NMFS in particular—would continue pipeline studies that had been under the IFWT umbrella, no equivalent of IFWT served during construction to promote and coordinate pipeline studies on a broad interagency basis. For fish and wildlife matters, the initiative passed to JFWAT, and attention shifted from the general development of a data base to implementation, enforcement, and evaluation of field experience.

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[57] Interagency Fish Working Team Meeting, "Minutes," July 31, 1970.

[58] See Memorandum from Morris J. Turner, pipeline coordinator, BLM, to Burton Silcock, state director, BLM, Subject: "Interagency Fish and Wildlife Team," December 4, 1970.

[59] See Interagency Fish and Wildlife Team, Fisheries Section, "Minutes of Meeting," October 16, 1973.

[60] Interview with Julius Rockwell, APO, Anchorage, July 12, 1977.

[61] BLM had an early agreement with Alyeska that pre-permit work would be reimbursed after agreements were signed. FWS subsequently got a similar agreement before construction started. (Interview with Julius Rockwell, APO, July 12, 1977.)

[62] Interviews with Julius Rockwell, *List of Streams and Other Water Bodies along Trans-Alaska Pipeline Route*, fourth revised draft, July 1, 1977, in which the introduction states that 'Less than a score of the 900+ streams listed can be considered to be 'known' and of these probably less than five are known well."

[63] Interview with James Hemming, APO-JFWAT, Anchorage, May 12, 1977.

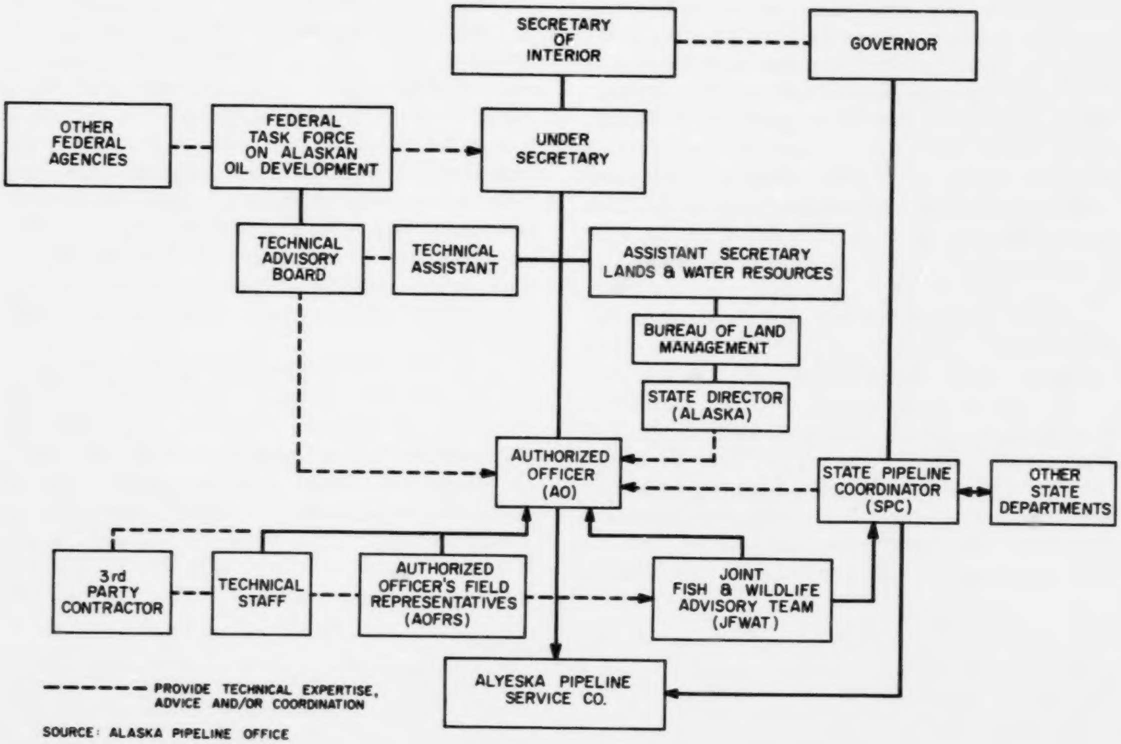
[64] Specific examples mentioned were NMFS Valdez terminal studies and FWS Prudhoe Bay water fowl studies. (Interview with Melvin Monson, FWS, Anchorage, May 27, 1977.)

Organizing APO and JFWAT

Uncertainties were inherent in a project where neither the engineering nor the environmental-biological elements could be completely accounted for or predicted in advance, given the limitations of the information developed during the planning phase. One possible response to this problem, as it carried over into the construction phase, would be to concentrate authority in the engineers, who would "balance" the known and the elusive and try to arrive at a single, clear-cut decision, recognizing that it might not always prove to be the "right" decision. Besides, good engineering would be essential to avoiding major environmental damage in any case, and most of the planning effort was directed, with substantial success, at engineering and related technical questions. A second possible response would be to provide some measure of authority to biologists, since their experience and judgements would be needed especially when adequate information about environmental problems and potential solutions to them was not already available.

There was probably as much, if not more, infighting between FWS and BLM over the issue of who should have what authority for construction surveillance as there was over any other issue during the planning period. Essentially, BLM's objective was to keep surveillance authority as concentrated as possible under the authorized officer (AO), who was at that time expected to be both a BLM official and an engineer. FWS aimed for independent surveillance authority. One early FWS version would have split the federal surveillance organization under the AO into dual engineering and environmental sections. Later, FWS sought only to keep its surveillance staff positions independent of AO authority.

The Alaska Pipeline Office (APO) plan that finally emerged combined some elements of the FWS position with that of BLM, although the pipeline division, out of which APO was built, was removed from BLM line authority and


SECRETARY OF INTERIOR
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UNDER SECRETARY
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TECHNICAL ASSISTANT
ASSISTANT SECRETARY LANDS & WATER RESOURCES
BUREAU OF LAND MANAGEMENT
STATE DIRECTOR (ALASKA)
AUTHORIZED OFFICER (AO)
STATE PIPELINE COORDINATOR (SPC)
OTHER STATE DEPARTMENTS
3rd PARTY CONTRACTOR
TECHNICAL STAFF
AUTHORIZED OFFICER'S FIELD REPRESENTATIVES (AOFRS)
JOINT FISH & WILDLIFE ADVISORY TEAM (JFWAT)
ALYESKA PIPELINE SERVICE CO.
PROVIDE TECHNICAL EXPERTISE, ADVICE AND/OR COORDINATION

SOURCE: ALASKA PIPELINE OFFICE

FIGURE 2: GOVERNMENT SURVEILLANCE ORGANIZATION

placed directly under the Secretary's Office. The APO scheme concentrated authority in the AO and the engineers in both central office and field, and FWS monitors were placed under the AO's and the engineers' operating authority. (See Figure 2.) But, unlike previous BLM plans, one version of which might have dispensed with FWS monitors altogether, FWS (and NMFS) monitors were placed in JFWAT, an entity located "somewhere between," and therefore partially independent of both, the federal and state monitoring organizations.

A BLM statement of how to approach the general issue of organization in pipeline planning as well as construction monitoring was formulated in May 1972:

> Basic to pipeline related cooperative arrangements must be a recognition of:
>
> 1. The Secretary's being the responsible federal official under NEPA.
> 2. The authorized officer's paramount role, subject to ultimate authority in the Secretary.
> 3. BLM's responsibility for administration of the public lands.
> 4. One project head and one direct channel of official communication with the permittee, the Congress, and the press ...[65]

Later in 1972, following discussion with Alaska FWS officials about the prospective structure of the construction surveillance organization, the state director of BLM in effect applied the above general principles to some current FWS proposals. The FWS officials had proposed that any FWS people on the AO's "team" should report to the FWS director and not to the AO. They also suggested that a FWS person have a "position similar to assistant chief, Division of Pipeline, to assure a direct voice in project management; ..."[66] The state BLM director strongly opposed these proposals, stating among other things, that "From a management standpoint we cannot expect [other] Departments to cooperate as part of the AO team ... if intra-Interior agencies do not operate as a single entity," and further, "We must have control within the AO's team; separate intra-Interior agencies will not facilitate our task of environmental protection (in other words, we cannot have someone always second guessing, rather they need to be part of these decisions)."[67]

Similar proposals were made again by FWS in Alaska and Washington throughout the fall months of 1973, although the "dual authority" approach appears to have had a shorter life than the independent FWS monitor scheme.[68] Each time, the proposals met similar opposition and, ultimately, they were rejected at the department level. What FWS officials did obtain was recognition of their right to select and screen their own people for assignment to the surveillance team, and the FWS monitors would maintain administrative ties to FWS while they were under the formal operating authority of the AO. Some last skirmishes occurred over the issue of how many FWS monitors would be hired and when. These questions were not finally resolved until early 1974, but, by then, the fish and wildlife agencies had already scored their best points when agreement was reached that a joint federal-state fish and wildlife monitoring organization would be established.

The Joint Fish and Wildlife Advisory Team (JFWAT) proposal had to overcome another form of opposition, however. During the summer and fall of 1973, Interior-BLM officials were moving toward a version of APO that might have left out FWS and NMFS altogether. The plan was to retain a relatively small team, primarily from BLM's pipeline division, to oversee a larger third-party contractor group that would supply DOI with both the engineering and environmental monitoring expertise needed during the construction phase. FWS was not alone in perceiving this plan as a potential means of dispensing with interagency participation in construction surveillance. It undercut the Corp of Engineers' interest in supervising pipeline engineering, a prospect that the Corps had been negotiating with Interior for more than a year,[69] and it sounded some alarms in Alaska state government, where there was already concern about the federal-state negotiations, which remained stalled until after the Trans-Alaska Pipeline Authorization Act became law.[70]

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[65] Memorandum from associate director, BLM, Washington, D.C., to Deputy Under Secretary, Subject: "EPA Involvement in Trans-Alaska Pipeline Project," May 19, 1972. This statement was precipitated by a meeting between DOI-BLM and EPA officials after the latter expressed the desire to increase their involvement in design review, permit drafting, and other project activities.

[66] Memorandum from state director, BLM, Alaska, to director, BLM, Washington, D.C., Subject: "BLM-USGS and BLM-BSF&W Pipeline Involvement Discussion," November 2, 1972.

[67] Ibid. Similar problems were presented by concurrent USGS proposals.

[68] This summary of the FWS position is based primarily on interviews with Gordon Watson, FWS, Anchorage, May 19, 1977; Joel Greenstein, Office of Administration and Management Policy, DOI, Washington, D.C., August 23, 1977; Lynn Greenwalt, Director, FWS, Washington, D.C., August 25, 1977; and LeRoy Sowl, FWS Anchorage, September 13, 1977. Also see Memorandum from deputy area director, FWS, Anchorage, to director, BSF&W, Washington, D.C., Subject: "Draft Proposed Pipeline-Road Surveillance Team," November 3, 1972; Bureau of Sport Fisheries and Wildlife, Alaska Area, "Briefing Statement—Construction Monitoring for the Trans-Alaska Pipeline," December 19, 1973; and Department of the Interior, Office of Management Consulting, *Trans-Alaska Pipeline Management Handbook*, February 1974, pp. 18-20.

[69] Interview with Burton Silcock, former director, BLM, Anchorage, May 11, 1977.

An FWS "briefing statement," prepared in the Alaska Area office in December 1973, linked the contractor issue to a more fundamental FWS interest:

> Delaying the construction until we have all the answers is neither practical nor possible. Therefore, it is critical that people well grounded in wildlife resource training and experience be present to examine what happens. It is critical that these people be in-house personnel rather than contractors so that their experience can be fully evaluated and applied to future pipelines and other construction.[71]

Despite persistent opposition from within the pipeline division-APO group,[72] the JFWAT proposal was finally adopted by Interior, and the third-party contractor scheme was revised to make room for fish and wildlife monitoring by FWS, NMFS, BLM, and Alaska Deparment of Fish and Game biologists. The fish and wildlif staffs of federal and state agencies, including BLM, had formed an alliance, and critical pressure was brought to bear, particularly from the state side of the group.[73]

The state Commissioner of Fish and Game wanted to assure an effective state voice in fish and game protection activities along the entire right-of-way, regardless of land ownership; the recently designated state pipeline coordinator, just beginning to build an organization, saw JFWAT as potential staff support to him; and the biologists, regardless of their different federal and state agencies of origin, wanted to extend their IFWT experience into the construction phase. And a key member of the biologist group was BLM's own wildlife biologist. As stated by one of the biologist founders of JFWAT, the concept "was approved because too many people were behind it."[74] Moreover, the ground had been prepared for such an organization at the end of 1973, when federal and state negotiators, partly at the urging of the state Commissioner of Fish and Game, incorporated a provision into the federal-state cooperative agreement calling for joint federal-state protection of fish and wildlife along the length of the pipeline route during construction.[75]

It was nonetheless clearly established that in the federal monitoring organization the authorized officer was to have full operational authority within the organization as well as budget authority over all pipeline-related work of federal agencies in Alaska.[76] Very early on, "The authorized officer made it clear the he [would] have a low tolerance for [JFWAT] personnel who go running back to their parent agencies in any attempt to go around finished decisions."[77] In response, two of JFWAT's founders "anticipated decisions which will not be to our liking and . . . asked . . . that biological considerations be given a fair weight in the decision making process."[78]

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[70] "How BLM Wants to Police Pipeline," *Anchorage Daily News*, August 22, 1973, and A. Cameron Edmondson, "Third-Party Supervision for the Pipeline?" *Alaska Industry* (October 1973), pp. 33-35.

[71] BSFW, Alaska, "Briefing Statement," p. 3.

[72] Memorandum from supervisory fish and wildlife biologist, Special Studies, FWS, Anchorage, to file, Subject: "Meeting on Biological Monitoring Team," February 20, 1974.

[73] This account of JFWAT's origin is based on interviews primarily with James Hemming, BLM-JFWAT, Anchorage, May 12, 1977; Michael Smith, former chief of habitat, ADFG, Anchorage, May 17 and 19, 1977; Gordon Watson, FWS, May 19, 1977; LeRoy Sowl, FWS, July 7, 1977; Rod Pegues, assistant attorney general, State of Alaska, Juneau, July 26, 1977; and Norman Gorsuch, former state attorney general, Juneau, July 27, 1977.

[74] Interview with LeRoy Sowl, FWS, Anchorage, July 7, 1977.

[75] Cooperative Agreement between United States Department of Interior and State of Alaska regarding the proposed Trans-Alaska Pipeline, provision II.6., January 8, 1974.

[76] U.S. Department of the Interior, Office of the Secretary, Order No. 2960, "Trans-Alaska Pipeline-Organizational and Functional Responsibilities," January 23, 1974; Memorandum from Under Secretary to director, BSFW, Subject: "Personnel and Budgeting Procedures for Trans-Alaska Pipeline," March 7, 1974; and Memorandum from Under Secretary to Assistant Secretary for Fish and Wildlife and Parks, Subject: "Alaska Pipeline," April 23, 1974.

[77] Memorandum from activity leader, EDS, FWS, Anchorage, to Files, Subject: "Meeting with Authorized Officer," April 12, 1974.

[78] Ibid.

Part 3 – Construction Phase

Chapter V—Government Surveillance Organization and Policy

When Congress in late 1973 passed legislation calling for "the earliest possible construction of a trans-Alaska pipeline," it was also cognizant of the environmental issues involved:

> The Secretary or agency head, prior to granting a right-of-way or permit ... for a new project which may have a significant impact on the environment, shall require the applicant to submit a plan of construction, operation, and rehabilitation for such right-of-way or permit which shall comply with this section. The Secretary or agency head shall issue regulations or impose stipulations which shall include, but shall not be limited to: (A) requirements for restoration, revegetation, and curtailment of erosion of the surface of the land; (B) requirements to insure that activities in connection with the right-of-way or permit will not violate applicable air and water quality standards nor related facility siting standards established by or pursuant to law; (C) requirements designed to control or prevent (i) damage to the environment (including damage to fish and wildlife habitat), (ii) damage to public or private property, and (iii) hazards to public health and safety; and (D) requirements to protect the interests of individuals living in the general area of the right-of-way or permit who rely on the fish, wildlife, and biotic resources of the area for subsistence purposes ...."[1]

It was this mandate for expeditious construction and environmental protection that provided the context in which government surveillance took place and must be understood. The differing nature of these goals meant that a major responsibility of governmental surveillance organizations would be to determine how strongly environmental protection could be pursued without compromising the goal of early completion.

This chapter describes the state and federal governments' pipeline surveillance organizations, their structure, functions, and authorities, with particular attention to the Joint Fish and Wildlife Advisory Team and to those state and federal statues important for the protection of fish and wildlife resources during construction of the trans-Alaska pipeline. The following two chapters then discuss how the process that was established for protection of fish and wildlife worked during construction.

General Authority and Structures

Right of Way Agreements

Governmental surveillance during the construction phase of the trans-Alaska pipeline was a condition of both state and federal right-of-way agreements[2] and was reimbursable by the permittee.[3] Attached to those agreements were parallel sets of general, environmental and technical stipulations. Intended to ensure system integrity and minimize environmental costs, the stipulations provided performance criteria to Alyeska for system design, construction planning and execution, and established procedures by which governmental review and surveillance functions would be exercised.

The federal right-of-way agreement also established that "in the performance of [the] Agreement, the following principles shall apply:

> (1) In the construction ..., operation, maintenance ... and termination of the Pipeline System, Permittee shall employ all practicable means and measures to preserve and protect the environment, as provided in this Agreement.
>
> (2) The parties shall balance environmental amenities and values with economic practicalities and technical capabilities, so as to be consistent with applicable national policies. . .
>
> (3) Permittees shall manage, supervise and implement the construction, operation, maintenance and termination of the Pipeline System in accordance with sound engineering practice, to the extent allowed by the state of the art and the development of technology. . ."[4]

---

[1] Public law 93-153, Section 101 (h) (2).

[2] Federal *Agreement and Grant of Right of Way for Trans Alaska Pipeline*, January 1974, sections 9A and 11. Unless otherwise noted, all references to specific section(s) of a right-of-way agreement or to specific stipulations refer to the federal agreement or to the stipulations attached thereto as "Exhibit D." It should be noted that the federal stipulations are closely paralleled by the state stipulations and share a common numerical reference scheme. The state *Right of Way Lease for the Trans-Alaska Pipeline* differs significantly from the federal agreement.

[3] Public Law 93-153, section 101 (1); *Agreement and Grant of Right-of-Way*, section 21; state *Right-of-Way Lease*, section 18.

[4] *Agreement and Grant of Right-of-Way*, p. 1.

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These "principles" are noteworthy in that they not only affirm Congress' intent that environmental resources be protected (subject to timely completion of construction) but they also administratively add two new limiting criteria. Environmental protection was to be "balanced" against "technical capabilities" and "economic practicalities." These criteria, together with the requirement for timely completion and the administrative discretion provided for in the stipulations, meant the authorized officer and his representatives would have the very substantial responsibility for deciding how vigorously environmental protection efforts would be pursued.

Alaska Pipeline Office

The Alaska Pipeline Office (APO) was officially established January 23, 1974, with the signing of the Agreement and Grant of Right-of-Way. That same day, then Secretary of the Interior Rogers C. B. Morton issued Secretarial Order No. 2960, setting out the department's organizational and functional responsibilities for the pipeline. That order designated the Under Secretary as the principal official of the Department of the Interior for trans-Alaska pipeline matters,[5] and established the position of the authorized officer (AO), chief executive officer of the APO.[6]

The establishment of APO under the Office of the Under Secretary served to consolidate the enforcement of the right-of-way agreement, drawing specialists from different agencies into a single organization which could fulfill the requirements of that agreement more efficiently than several separate organizations. It was in response to Alyeska's desires for "one-stop shopping" in face of the potential for administrative delays should too many agencies have partial jurisdiction over so large a project.

The Alaska Pipeline Office consists of the authorized officer, authorized officer's representative (AOR), administrative and realty branches and two professional staffs: a technical support group and the field surveillance staff. (See Figure 3.)

During construction, the AO had overall responsibility for APO and for ensuring compliance with the right-of-way agreement, stipulations, conditions of other federal permits, and with approved designs and specifications. He was responsible for inter- and intra-agency coordination, including the review and approval of operating plans of other government agencies who had responsibilities under the trans-Alaska pipeline agreement. He also maintained communications with Alyeska, federal and state agencies, and the public. In practice, the AO operated largely in the political realm of inter/intra-agency coordination, relations with the state and Alyeska, and with decisions having significant policy implications. Day-to-day management and supervision of APO was delegated to the authorized officer's representative (AOR).

APO's Office of Lands and Minerals was responsible for coordinating the issuance of all temporary-use permits, free-use permits, gravel sales, leases, disposal permits and amendments of pipeline system grants with the state or district offices of the Bureau of Land Management (BLM). In processing all land actions, APO functioned in a review and advisory capacity to BLM, which has statutory authority for their issuance.

APO's technical staff during the construction phase was a small (approximately eight professionals) multi-disciplinary group with expertise in fishery and wildlife biology, soils science, geology, recreation, and engineering. Headed by the technical staff coordinator, the technical staff had as their main responsibility the review of Alyeska's designs, "notice to proceed applications" (NTPAs), and "design change requests" (DCRs) in coordination with APO's technical support contractor, the Joint Fish and Wildlife Advisory Team (JFWAT), and other agencies. They also provided support to the field surveillance staff as needed for resolution of technical field problems and coordinated and recommended action on other project-related work involving technical issues. APO's technical support contractor, Mechanics Research, Inc., provided considerable manpower and expertise to the technical staff in the exercise of these duties and was given technical direction by the technical staff coordinator relating to these services.

The primary responsibility of APO's field surveillance staff was to ensure that approved designs, work plans, specifications, stipulations and Code of Federal Regulations were complied with by the permittee in the field. The staff was headed by the construction coordinator and consisted of approximately fifteen authorized officer's field representatives (AOFRs) and

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[5] U.S. Department of the Interior, Order No. 2960, January 23, 1974, section 3(a).
[6] Ibid., section 3(b).

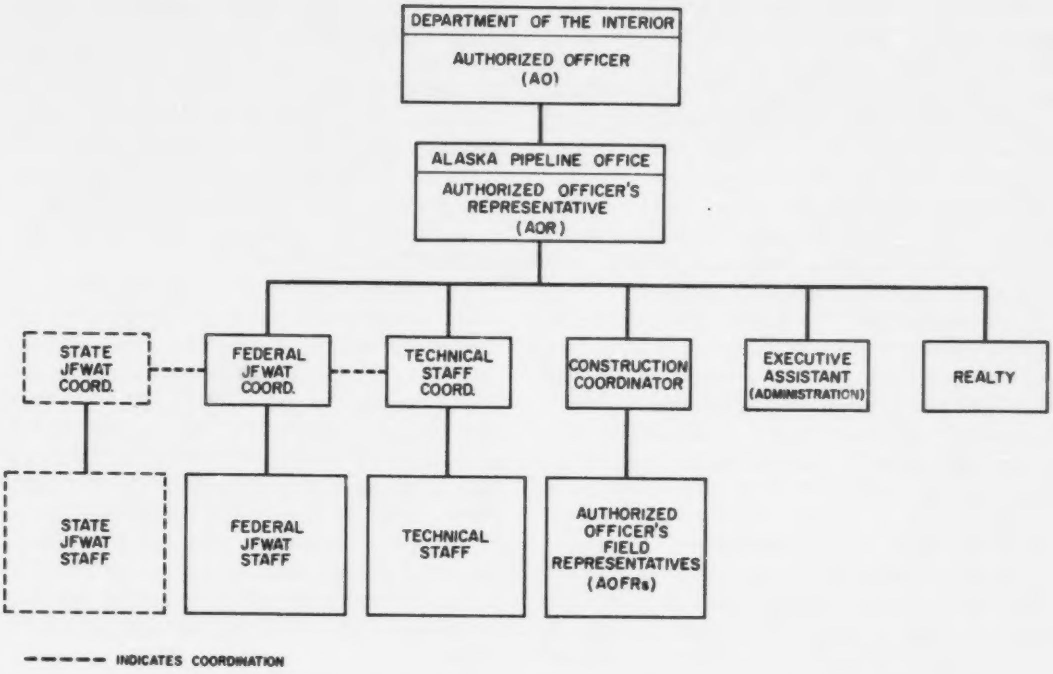
DEPARTMENT OF THE INTERIOR
AUTHORIZED OFFICER (AO)
ALASKA PIPELINE OFFICE
AUTHORIZED OFFICER'S REPRESENTATIVE (AOR)
STATE JFWAT COORD.
FEDERAL JFWAT COORD.
TECHNICAL STAFF COORD.
CONSTRUCTION COORDINATOR
EXECUTIVE ASSISTANT (ADMINISTRATION)
REALTY
STATE JFWAT STAFF
FEDERAL JFWAT STAFF
TECHNICAL STAFF
AUTHORIZED OFFICER'S FIELD REPRESENTATIVES (AOFRs)
INDICATES COORDINATION

FIGURE 3: ALASKA PIPELINE OFFICE ORGANIZATION CHART

alternate AOFRs. One AOFR and one alternate were assigned to each of the six construction sections and the Valdez terminal, and one AOFR was assigned to the pump stations and control systems.

AOFRs acted with delegated authority to make field decisions for the AO/AOR in the monitoring of permittee compliance. In addition to this primary function, they also participated in design reviews for notice to proceed applications and design change requests. AOFRs received field staff support through the environmental and engineering expertise of the technical support contractor and fish and wildlife expertise through JFWAT, both of which functioned in a strictly advisory capacity to the AOFR.

Technical Support Contractor

In order to provide additional technical assistance to the Alaska Pipeline Office, the Department of the Interior entered into a contract on February 1, 1974 with Mechanics Research Inc. (MRI), a private engineering consulting firm based in Los Angeles and at the time a wholly-owned subsidiary of System Development Corporation. Services to be rendered included system and sub-system design reviews, systematic "spot checks" of construction activities, data gathering and special studies and reports as needed by APO.

This "third party" arrangement had at least three advantages to offer the Interior Department: it provided needed expertise that was in short supply or unavailable within government; it provided for a staff without the high turnover and continuity problems common with temporary posts; and it allowed for the retention by MRI of needed expertise on short notice by subcontract, thereby avoiding the more cumbersome and time-consuming requirements of federal procurement regulations.

MRI performed its contractual obligations with the help of two subcontractors: Gulf Interstate Engineering Corporation (GIE), which provided technical pipeline engineering expertise, and Ecology and Environment Incorporated (EEI), which provided similar support services in the environmental sciences, exclusive of strictly fish and wildlife matters, which were the responsibility of the Joint Fish and Wildlife Advisory Team.

Generally speaking, design review functions of the technical support contractor in Alaska were coordinated through APO's technical staff coordinator, with field input coordinated by the construction coordinator. Field surveillance functions of the third party contractor were directed by MRI's area engineers, who coordinated with the AOFRs in each section.

At the end of the first season of pipeline construction (December 1975), the technical support contractor had about 60 employees in Alaska. EEI's staff consisted of 10 professional "environmentalists" and a secretary. MRI had a field monitoring staff of 11 professionals and a central office design review staff of 6 professionals, which included a senior project engineer assigned from GIE. The remainder of the staff were GIE engineers, administrative and office support personnel and senior management. As suggested earlier, additional specialists were brought in when needed. Staff was also assigned to design review functions in Houston and Los Angeles during the early stages of the project.

State Pipeline Coordinator's Office

Due to a large number of unresolved jurisdictional issues and the mutual disinclination of the state and federal governments to litigate those issues as they related to the pipeline,[7] a cooperative agreement was negotiated and entered into on January 8, 1974 between the federal and state governments.[8] The cooperative agreement set out which lands were to be covered by state and federal right-of-way agreements; provided for cooperation and generally defined the jurisdictional responsibilities of state and federal surveillance efforts; provided for the establishment of a joint state-federal fish and wildlife surveillance component; provided for the construction of the Yukon River to Prudhoe Bay state highway and three public airports and established the state's right and responsibility of enforcing during construction the Highway and Airport Stipulations, which were attached to the cooperative agreement as Exhibit A.

In anticipation of a right-of-way lease application from Alyeska, the state's pipeline coordinator (SPC) was named on January 30, 1974. The State Pipeline Coordinator's Office (SPCO) was formally established on April 1 of that year and the lease was executed one month later on May 3. The state pipeline coordinator and his staff were formally part of the Department of Natural Resources, but in order to "achieve maximum coordination of, and emphasis upon, the state's surveillance activities" they were detailed to the Office of the Governor.[9]

The state pipeline coordinator's duties essentially paralleled those of the authorized officer. Under the terms of the cooperative agreement the state right-of-way covered approximately 250 linear miles. On those lands the state pipeline coordinator's approval was required for all notices to proceed (NTP) for pipeline construction. The state also had exclusive authority on those lands to determine compliance with the terms and stipulations regulating pipeline construction except those conditions directly related to system integrity which could be enforced by either the SPC or the federal authorized officer (AO).[10]

The state right-of-way also included the streambeds of navigable waters,[11] listing 29 rivers specifically claimed navigable by the state. Because what constitutes "navigability" has not been defined to the mutual satisfaction of both the state and federal governments, the SPC and AO shared joint responsibility for approving river crossing NTPs on federal land for the 29 named rivers.

In the case of the Yukon River to Prudhoe Bay haul road, the state was both the permittee (Alyeska being the state's execution contractor) and also responsible for stipulation enforcement. Haul road surveillance was carried out by Alaska Department of Highways personnel.

Structurally, SPCO was broken down into three groups—administration, technical staff of five professionals plus two consultants for fish and wildlife and environmental matters, and field surveillance staff of fourteen. Like APO, they received fish and wildlife "advisories" from JFWAT and had the capability for purchase of outside expertise by contract, including arrangements for limited use of APO's third party contractor.

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[7] See Appendix B, "The Jurisdictions of the Federal and State Governments Over the Construction of the Trans-Alaska Pipeline."

[8] *Cooperative Agreement between the United States Department of the Interior and the State of Alaska Regarding the Proposed Trans-Alaska Pipeline*, January 8, 1974.

[9] Memorandum of the Commissioner of the Alaska Department of Natural Resources, March 11, 1974.

[10] *Cooperative Agreement between U.S. Department of the Interior and State of Alaska*, January 1974, section II(2).

[11] Section 6(m) of the *Statehood Act* incorporates by reference the *Submerged Lands Act of 1953*, granting title to these lands to the state.

Joint Federal/State Fish and Wildlife Advisory Team

The Joint Fish and Wildlife Advisory Team (JFWAT) was formed in May 1974, pursuant to the Cooperative Agreement.[12] JFWAT was composed of biologists from the U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), Bureau of Land Management (BLM), and the Alaska Department of Fish and Game (ADFG). It had a professional staff of 31: 11 from FWS; 3 from NMFS; 2 from BLM, including JFWAT's federal coordinator; and 15 from ADFG, including the state supervisor.

JFWAT's primary mission was to assure the protection of fish and wildlife resources during pipeline construction. Its primary mode of operation was in its capacity as an advisor to the authorized officer and state pipeline coordinator, who had the responsibility for enforcing the right-of-way agreements and stipulations.

Statutory Authorities

In addition to this advisory function, the parent agencies of JFWAT also had statutory obligations relating to the pipeline construction. Of these, the most important were provisions of the Fish and Wildlife Coordination Act of 1934, Endangered Species Act of 1973, the Bald and Golden Eagle Act of 1940, and, most important, sections of Alaska Statutes, Title 16.[13]

The Fish and Wildlife Coordination Act provides that any federal agency which issues a permit authorizing the impounding, diverting, or controlling of navigable waters must first consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service. Although this requirement for consultation is mandatory, FWS's and NMFS's comments are advisory and may be excluded from the permits.

The Fish and Wildlife Coordination Act applied to the permits of four separate federal agencies during pipeline construction: BLM in issuing its permit and right-of-way agreement and some additional permits; the Environmental Protection Agency (EPA) in issuing permits under the Federal Water Pollution Control Act for discharges into navigable waters; U.S. Army Corps of Engineers in issuing permits for work on structures or the disposal of dredged or fill material into navigable waters; and the U.S. Coast Guard in issuing permits for bridges across navigable streams.

As a practical matter, the substantive requirements of the Fish and Wildlife Coordination Act were largely exercised through the participation of FWS and NMFS in JFWAT, which reviewed and commented on all relevant permit applications.

The Endangered Species Act provides for the protection of various species of fauna and flora which are classified as either "threatened" or "endangered" and their habitats, and prohibits the taking or harassment of such species.

During pipeline construction, application of the Endangered Species Act resulted in the relocation of planned facilities on two occasions. In both cases, the facilities (a planned airstrip and construction camp just south of Franklin Bluffs; and Pump Station 2 near Sagwon Bluffs) were moved to avoid conflicts with nesting habitat of the endangered arctic peregrine falcon.

The Bald and Golden Eagle Protection Act prohibits the taking, possession, sale or purchase of any bald or golden eagle, their nests or eggs. Pursuant to this act, FWS and the U.S. Forest Service entered into an agreement requiring buffer strips around eagle nesting trees. During pipeline construction along the Lowe River near Valdez, a previously unidentified nesting tree required a minor shift in the alignment to avoid the nest.

Title 16 of Alaska Statutes provides for the conservation, development and regulation of fish and wildlife resources within the state by the Alaska Department of Fish and Game. In order to facilitate the enforcement of the state's fish and game statutes, the Commissioner delegated significant authority under this title to ADFG's pipeline surveillance supervisor. Specifically, the state head of JFWAT was delegated the authority to manage, protect, maintain, improve and extend fish, game and aquatic plant resources of the state; the authority to require that every dam or other obstruction built across a stream frequented by salmon or other fish shall have a fishway constructed to provide fish passage; and the authority to determine, require, and issue written approvals for activities affecting anadromous fish streams.[14] This last delegated authority—to issue approvals for activities affecting anadromous fish streams—significantly expanded JFWAT's otherwise advisory role and greatly strengthened their bargaining position vis-a-vis APO and SPCO regarding how strongly fishery protection efforts should be pursued. Alaska Statute 16.05.870 requires issuance of a separate permit for each crossing of an anadromous fish stream,[15] as well as for a number of ancillary activities affecting those streams (e.g., gravel removal from flood plains of those streams, waste discharges affecting subject streams).

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[12] *Cooperative Agreement*, Section II(6).

[13] Alaska Statutes 16.05.020(2); 16.05.870; 16.05.840.

[14] Alaska Statute 16.05.020(2); 16.05.840; 16.05.870(c). Memorandum from James W. Brooks, Commissioner ADFG, to pipeline surveillance supervisor, June 26, 1974; interview with Allan Carson, state pipeline supervisor, JFWAT, September 12, 1977.

This immediately raised two issues: Was Alaska Statute 16 to be applied to federal lands? and What constitutes an anadromous fish stream? Like other questions of federal/state jurisdiction, the applicability of AS 16 on federal lands was not a question either the state or federal government wished to litigate, nor did they have time to do so.[16] As a practical matter, the federal authorized officer consented to its application on federal lands with the proviso that he did not, by this action, intend to set a precedent in a legal sense.[17]

The question of which streams are anadromous under AS 16.05.870 was equally fraught with difficulties. Prior to 1975, the application of this law differed in different regions of the state. For the purposes of that act, every stream that flowed into the Gulf of Alaska and every tributary of those streams was to be considered an anadromous fish stream. In the northern areas of Alaska, however, the Commissioner of Fish and Game allowed designation on a stream-by-stream basis only. This approach was superseded in March 1975 with the issuance of the Department of Fish and Game's *Anadromous Fish Stream Catalogue*, which included all tributaries of designated anadromous fish streams in all parts of the state as protected anadromous fish streams. This modification of the anadromous fish stream list resulted from increased information and data on subject fish species' distribution patterns throughout the state. In effect, this made nearly every stream affected by the pipeline construction subject to Title 16 permit requirements.

For a number of reasons, AS 16 permits were *not* required for every stream crossing; the APO was opposed to such blanket application, JFWAT did not have sufficient staff to monitor all crossings, and there was a general sense that a more discrete policy of application was in order.[18]

During the early 1970's, the Interagency Fish and Wildlife Team had begun work on a catalogue of known fish streams along the proposed pipeline route as part of the overall effort at developing a resource inventory for the project. Subsequently, JFWAT boiled that information down to a list of streams and critical periods in the life history of species known to occur in each stream. This list provided the basis for restricting construction activities in streams during critical periods, including migration, spawning and egg hatching, as well as protection of over-wintering areas, all pursuant to stipulation 2.5.3.1. As working procedures evolved, the streams appearing on the fish stream list (as updated by current information) also became, *de-facto*, those streams for which an AS 16.05.870 permit would be required. Although this may have been a reasonable accommodation of the realities of construction and field surveillance, meeting the intent of this law became thereby critically dependent upon the adequacy of the data base. During the 1976 construction season, approximately 75 additions and 50 deletions were made to the list, and another 40 to 50 new fish streams were discovered in the summer of 1977.[19] In addition, designation as a fish stream was limited to those streams in which the presence of fish had been documented, putting the burden of proof upon JFWAT.

Structure and Functions

On the federal side of the joint team, BLM employees were assigned directly to the Alaska Pipeline Office (APO) and detailed to JFWAT. National Marine Fisheries Service (NMFS) and Fish and Wildlife Service (FWS) employees detailed to JFWAT were also under the operational control of the authorized officer (AO) for day-to-day activities, with administrative authority (i.e., career development, hiring, firing) retained by the parent agencies. Generally speaking, APO's operational direction was exercised through JFWAT's federal coordinator or assistant federal coordinator.

State members of JFWAT were all employees of the Alaska Department of Fish and Game (ADFG). They were headed by the surveillance supervisor who reported to the chief of the habitat protection section, ADFG. They coordinated with and provided advices to the state pipeline coordinator and his staff in a manner essentially identical to the federal side, although they enjoyed a greater independence. Internally, JFWAT operated as a unit without significant regard for agency differences.

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[15] Anadromous fish species are defined as those which spend a portion of their lives in both salt and fresh water, i.e., all five species of Pacific salmon, Dolly Varden and rainbow trout (steelhead), arctic char, sheefish and whitefish. (Letter from Commissioner James Brooks to the Oil and Gas Association, September 17, 1973.)

[16] See Appendix B.

[17] Memorandum to AS 16 file from Allan Carson, December 13, 1974.

[18] Telephone conversation with Allan Carson, September 26, 1977.

[19] From a comparison of lists dated November 15, 1975 and February 16, 1977; and interview with Nancy Kavanagh, JFWAT, September 27, 1977.

The JFWAT organization was divided into four units: administration, office professional staff, field surveillance and technical evaluation. (See Figure 4.)

The office staff was primarily responsible for reviewing construction drawings and plans, notice to proceed applications, design change requests and other Alyeska submissions potentially affecting fish and wildlife resources. Following review, JFWAT issued formal advices to the offices of the authorized officer (AO) and state pipeline coordinator (SPC) as to the potential effects of the proposed action and possible courses of action to minimize those effects. In addition, this staff reviewed and commented on various state and federal permits and provided support services to field monitors when needed.

JFWAT's field surveillance biologists had as their main function assuring compliance with fish and wildlife stipulations by the permittee and its agents in the field. This function was exercised by the issuance of advices to the authorized officer's field representatives (AOFRs) on federal land, or the field surveillance officers (FSOs) on state lands. Most of this communication was verbal, but formal advices were transmitted by written advisory memos. In addition to this advisory and support function for AOFRs and FSOs, field biologists were responsible for issuing advisory memos giving notice that an AS 16.05.870 permit would be forthcoming for instream work (a function exercised by both state and federal biologists), as well as various data collection activities including providing field information to the design review staff.

The third major JFWAT function was "technical evaluation." This consisted of a series of research projects designed to develop a qualitative and quantitative understanding of the effects of pipeline construction on fish and game resources; some of these are continuing during pipeline operation, with results being published as they become available in a series of technical evaluation reports. JFWAT's report series also includes reports documenting their monitoring experiences.

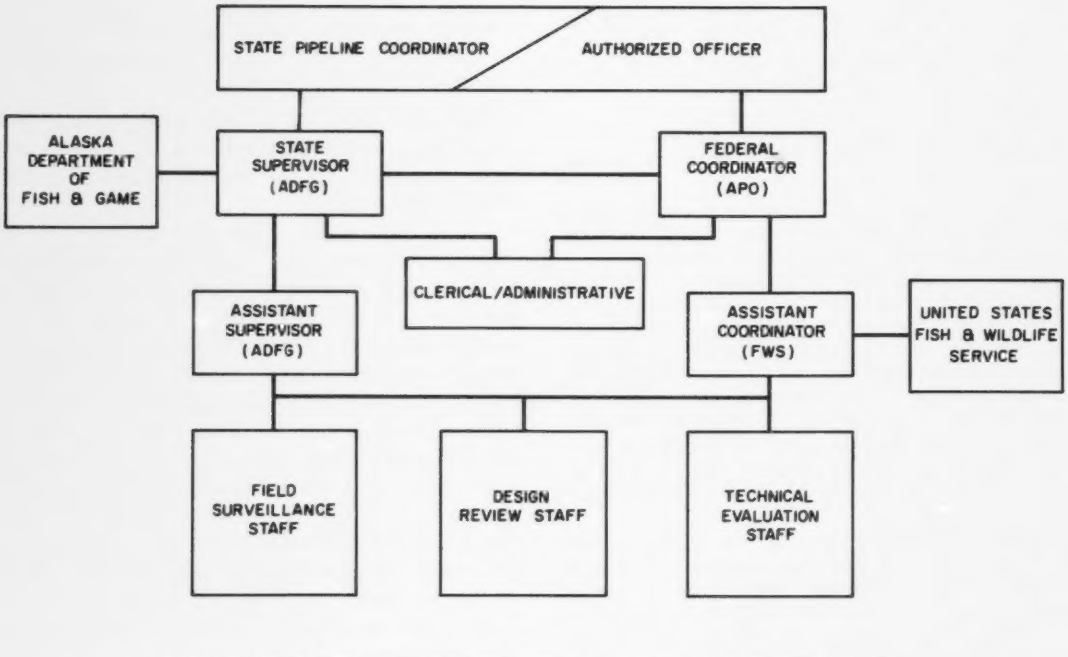
STATE PIPELINE COORDINATOR
AUTHORIZED OFFICER
ALASKA DEPARTMENT OF FISH & GAME
STATE SUPERVISOR (ADFG)
FEDERAL COORDINATOR (APO)
CLERICAL/ADMINISTRATIVE
ASSISTANT SUPERVISOR (ADFG)
ASSISTANT COORDINATOR (FWS)
UNITED STATES FISH & WILDLIFE SERVICE
FIELD SURVEILLANCE STAFF
DESIGN REVIEW STAFF
TECHNICAL EVALUATION STAFF

FIGURE 4: JOINT FISH AND WILDLIFE ADVISORY TEAM ORGANIZATION CHART

Surveillance System Assumptions

Each of these government surveillance organizations — APO, SPCO and JFWAT — were designed and staffed around two major assumptions: that Alyeska would have an effective quality assurance/quality control (QA/QC) program in place which would only require a "spot check" level of monitoring by government; and that government's (and Alyeska's) interest in early project completion would best be served by centralizing government responsibilities and authority in the Alaska Pipeline Office and State Pipeline Coordinator's Office and thereby providing, insofar as possible, a "single point of contact" for the permittee.

Quality Assurance/Quality Control

The basic requirements for Alyeska's QA program were specified in Section 9 of the right-of-way agreement, and by stipulations 1.18.1, 3.9.1, and 3.9.2:

> 9. Construction Plans and Quality Assurance Program
>
> A. Permittees shall submit construction (including design) plans, a quality assurance program and other related documents as deemed necessary by the Authorized Officer, for review and approval prior to his issuing Notices to Proceed.
>
> B. The quality assurance program shall be comprehensive and designed to assure that the environmental and technical Stipulations in this Agreement will be fully complied with throughout all phases of construction, operation, maintenance and termination of the Pipeline System.
>
> C. The following criteria shall be included in the quality assurance program, although Permittees are not limited to these criteria:
>
> (1) Provide adequate and appropriate means and procedures for the detection and prompt abatement of any actual or potential condition that is susceptible to abatement by Permittees which arises out of, or could affect adversely, the construction, operation, maintenance or termination of all or any part of the Pipeline System and which at any time may cause or threaten to cause: (a) hazard to the safety of workers or to public health or safety (including but not limited to personal injury or loss of life with respect to any person or persons) or (b) serious and irreparable harm or damage to the environment (including but not limited to areas of vegetation or timber, fish or other wildlife populations, or their habitats, or any other natural resource).
>
> (2) Provide adequate and appropriate means and procedures for the repair and replacement of improved or tangible property and the rehabilitation of natural resources (including but not limited to revegetation, restocking fish or other wildlife populations and reestablishing their habitats) that shall be destroyed if the immediate cause of the damage or destruction arises in connection with, or results from the construction, operation, maintenance, or termination of all or any part of the Pipeline System.
>
> (3) Provide for component and systems quality through adequate quality control management and planning, and inspection and test procedures.
>
> (4) Assure that the selection of Permittees' contractors, subcontractors and contract purchases of materials and services are based upon the above quality control procedures.
>
> (5) Determine quality performance by conducting surveys and field inspections of all of the facilities of Permittees' contractors and subcontractors.
>
> (6) Maintain quality determination records on all of the above procedures to insure satisfactory data identification and retrieval.
>
> [Stipulation] 1.18.1 During the construction, operation, maintenance and termination of the Pipeline System, Permittees shall conduct a surveillance and maintenance program applicable to the subarctic and arctic environment. This program shall be designed to: (1) provide for public health and safety; (2) prevent damage to natural resources; (3) prevent erosion; and (4) maintain Pipeline System integrity.
>
> [Stipulation] 3.9.1 All construction, operation, maintenance and termination activities in connection with the Pipeline System shall be conducted so as to avoid or minimize thermal and other environmental changes and to provide maximum protection to fish and wildlife and their habitat, and people. All working platforms, pads, fills and other surface modifications shall be planned and executed in such a way that any resulting degradation of permafrost will not jeopardize the Pipeline foundations.
>
> [Stipulation] 3.9.2 Acceptable plans, procedures, and quality controls that ensure compliance with Stipulation 3.9.1 shall be submitted in accordance with Stipulation 1.7 (relating to Notices to Proceed, etc.).

Thus, Alyeska's QA program has both policing and documenting functions that affect all aspects of the project from vendor surveillance through pipeline termination.

From the early days of BLM's pipeline division, government construction-monitoring strategy was to field a relatively small team of professionals to "spot check" construction as a means of evaluating the effectiveness of Alyeska's quality program and, thereby, the project's compliance with the terms and conditions of the right-of-way agreements. It was felt that "if government [was] going to impose itself on private industry for the benefit of [the] public, it should be efficient" and that this strategy would best meet that criterion.[20] It also meant that the efficiency of government monitoring efforts, including those of JFWAT, would in part be dependent upon the adequacy of Alyeska's QA/QC program.

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[20] Interviews with Morris J. Turner, acting AO, Anchorage, August 3 and 5, 1977.

Government would not, after all, be able to provide anything approaching 100 percent inspection of critical construction activities. Rather, its monitors would see a much smaller portion of construction, and, based upon their verification of compliance with applicable standards and stipulations, government could thereby reasonably presume substantial compliance line-wide. On the other hand, should quality control prove chronically weak in one or more areas, a presumption of compliance line-wide would not be justified.

Alyeska submitted the first of its quality assurance (QA) manuals to APO for review in mid-February 1974. Mechanics Research Inc. (MRI) was the only component of the government monitoring effort with expertise in QA/QC programs. MRI's review concluded in part ". . . the Permittees' quality assurance system is not adequate to insure compliance with the Permit Stipulations. The magnitude of the deficiencies are sufficient to warrant immediate action to improve the quality assurance system."[21] The inadequacies of the program involved both structural problems as well as general lack of detail, including descriptions of the staffing, planning and implementation of and environmental protection organization.

Following several months of negotiations and revisions, Alyeska's QA program was "tentatively approved" by the authorized officer on July 19, 1974, subject to certain revisions, "so that construction would not be delayed."[22]

Over the next several months, Alyeska did little to correct the deficiencies in its QA/QC program. In June 1975 the congressional General Accounting Office took the matter up with the authorized officer, and the GAO later reported:

> In July 1975, the Authorized Officer, the State Pipeline Coordinator, and Alyeska studied the quality assurance problems to determine what corrective actions should be taken. The study showed that many of the quality control problems were similar to the concerns expressed by the Authorized Officer when he tentatively approved the quality assurance program. The study showed the need
>
> — to give quality control representatives the authority to halt nonconforming work;
>
> — for a closer interface between Federal and State monitors and Alyeska so that nonconforming work found by the monitors could be quickly corrected; and
>
> — for many more environmentally oriented quality control personnel.[23]

Following corrective actions by Alyeska, including delegation of stop work authority to quality control personnel, the AO gave final approval to the quality assurance program on August 18, 1975.[24]

In spite of progress made in 1975, inadequate QA/QC performance continued to be a problem throughout construction. In January 1977, looking toward the operations phase of the pipeline, the Alaska Pipeline Office's acting AO wrote the president of Alyeska concerning the continuing inadequacies of its QA/QC program:

> I do not intend to review the numerous discussions and correspondence which exists on this subject, but rather my comments are meant to restate my recent verbal discussions with you on January 27. I am not now convinced that Alyeska has a comprehensive quality assurance program that will *fully assure stipulation compliance* [emphasis in original].

The acting APO chief went on to suggest that Alyeska submit a revised QA plan by the following month, considering these points:

> (a) Providing one quality assurance manager, not two as I understand currently exists . . . .
>
> (b) Removing the quality control from the pipeline department.
>
> (c) Providing adequate staffing (i.e., quality, not necessarily quantity, to include interdisciplinary professional personnel).
>
> (d) Developing a comprehensive work schedule to complement the existing plans and specifications. The schedule should be detailed, including all stipulated work items, e.g., revegetation. I believe any quality assurance program must include a detailed schedule for evaluating the work performance, i.e., timeliness.
>
> (e) Changing the now fragmented QA/QC system that exists to one with overall responsibility and authority for project stipulation assurance.
>
> (f) Insuring adequate authorities for the quality assurance program personnel to timely and effectively insure that the environmental and technical stipulation requirements are being fully complied with.[25]

During construction, environmental quality control was particularly deficient.[26] As one government inspector put it,

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[21] *Review and Critique of Alaska Pipeline Construction Phase Quality Assurance Manuals*, MRI Report 3210-01/1, April 30, 1974.

[22] U.S. Comptroller General Accounting Office, *Trans-Alaska Oil Pipeline — Progress of Construction Through November, 1975*, February 17, 1976, p. 34.

[23] Ibid.

[24] Ibid., p. 35.

[25] Letter from APO acting authorized officer to president, Alyeska, Subject: "Quality Assurance Program," January 31, 1977.

[26] U.S. Comptroller General, GAO, *Trans-Alaska Oil Pipeline — Information on Construction* . . . . August 23, 1977; JFWAT narrative surveillance reports 1975-77, numerous references; interview with Don Keyes, APO's construction coordinator, April 8, 1977 and others.

> Nearly every [report of non-compliance with stipulations] written by the agencies results from inadequate inspection by Q.C. Most probably, we have been negligent for not writing many more . . . based on poor inspection.[27]

Or, as Ecology and Environment, Inc.'s project manager characterizes their experience, "EEI's feeling is that environmental QC was essentially non-existent during the construction phase," explaining further that in the latter stages there were nominal environmental QC inspectors in the field, but far too few, and that they frequently had other, primarily civil, QC functions to perform.[28] These comments reflect the unanimous observations of government interviewees who commented on Alyeska's quality program — that QA/QC did not fulfill its function during construction. As a result, government surveillance officers were put in the position of having to assume a much larger role than was anticipated, or for which they were staffed.[29] "In order to assure that fish and wildlife resources were adequately protected, surveillance biologists of the Joint Fish and Wildlife Advisory Team were forced into attempting to provide 100 percent inspection instead of the intended spot check role."[30]

The basic reasons for this failure were lack of support for the quality program by Alyeska's senior management and the inability or unwillingness of APO (and SPCO) to utilize their authority and available sanctions effectively to compel compliance by Alyeska.[31] But, APO would have needed a very substantive reason for shutting down a billion dollar project "and maybe no one would have supported such a decision — but, then, we weren't really worried about that."[32]

Notwithstanding this, APO's acting authorized officer takes the position that APO's actions were the only reasonable ones under the circumstances.[33]

Throughout construction, APO was engaged in correspondence and negotiations with Alyeska over the QA/QC program. Commitments by Alyeska would be made to improve the system, "and they always did something,"[34] but little would actually change in the field.

APO took the position early on that one must assume the basic honesty and integrity of the people one deals with; when Alyeska said something would be done, it was "tantamount to certification."[35] This position was elaborated in a 1975 letter to Mechanics Research Inc.'s project manager in response to an MRI suggestion that APO review either the job descriptions or statement of required qualifications for Alyeska's quality inspectors. The AOR's response reads, in part:

> I take exception to your suggestion that we require Alyeska to define the qualifications they are requiring for their personnel . . .The permittees are some of the biggest companies in the industry. Their agent, Alyeska, has personnel of reputable backgrounds and in their own right are outstanding professionals. Their construction management contractors and execution contractors are noted among the best, if not the best, in this country. . .[36]

JFWAT's federal coordinator also suggests that Bechtel came with good credentials and that "everyone expected them to do a good job" in spite of weaknesses in the written plan.[37] Having adopted an accommodating posture early on, "when government did come down hard later, [Alyeska] bowed their backs."[38]

This early optimism toward Alyeska's quality control program was not, however, universal. MRI contended that the QA/QC plan was faulted in many respects — both organizational and procedural.[39] APO's management disagreed, characterizing MRI's concerns as "dotting i's and crossing t's" — the authorized officer's representative (AOR) viewed the problem not as perfecting the plan, but as getting a program implemented in the field.[40]

However reasonable APO's actions may have been, particularly in light of Congress' mandate for early construction, the lack of an effective

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[27] Memorandum from Blair Wondzell, FSO, to Vyrl Goff, Alyeska project manager, Section 3, October 13, 1976.

[28] Interview with Roger Gray, EEI, Anchorage, July 12, 1977.

[29] Interview with Morris J. Turner, acting authorized officer, August 16, 1977; Donald Keyes, APO construction coordinator, April 8, 1977; and others.

[30] Memorandum to AOR from technical staff coordinator, Subject: "Non Welding Quality Control Concerns," May 28, 1976. See also: letter from DOI Under Secretary Kent Frizzell to Senator J. Bennett Johnston, September 17, 1976 responding to questions of Senator Ted Stevens in U.S. Senate, Committee on Interior and Insular Affairs, *The Construction of the Trans-Alaska Pipeline System —Hearings*, 94 Cong., 2nd sess., July 26, 1976; U.S. Department of the Interior, Office of Audit and Investigation, *Study of the Alaska Pipeline Office Monitoring of Quality Assurance and Control by the Alyeska Pipeline Service Company*, September 10 1976.

[31] Interviews with James Hemming, JFWAT federal coordinator, Anchorage, August 31, 1977; Donald Keyes, APO construction coordinator, September 2, 1977; Morris J. Turner, acting AO, August 5, 1977. Also, statement of Charles Champion, state pipeline coordinator, quoted in *Wall Street Journal*, May 20, 1977; U.S. GAO, *Trans-Alaska Oil Pipeline—Information on Construction*, August 23, 1977.

[32] Interview with Morris J. Turner, acting authorized officer, Anchorage, August 5, 1977.

[33] Ibid., August 17, 1977. A position in part shared by James Hemming, JFWAT federal coordinator, August 31, 1977 interview.

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[34] Interview with Morris J. Turner, acting AO, Anchorage, August 5, 1977.

[35] Ibid., August 17, 1977.

[36] Letter to Frank Stivers from Morris Turner, March 3, 1975.

[37] Interview with James Hemming, JFWAT, August 31, 1977.

[38] Ibid.

[39] Interview with Richard Wolf, MRI deputy project manager, August 30, 1977.

[40] Interview with Morris J. Turner, acting AO, August 17, 1977. APO's authorized officer's representative (AOR) throughout most of pipeline construction, Morris Turner became acting AO early in 1977.

QA/QC program placed a substantial surveillance burden upon JFWAT (as well as APO and SPCO) for which they were neither designed nor sufficiently staffed to perform. Most, if not all, of the environmental problems which characterized construction, including the stream crossings and big game crossings discussed in Chapter VII, are, in part, directly or indirectly attributable to the failure of Alyeska to field an effective quality program.

Centralized Surveillance

The assumption that government's interests, particularly in terms of early project completion, would best be served by centralizing responsibilities and authorities as much as possible was a foundational concept for APO, SPCO and JFWAT.

Organizationally, the Department of the Interior was given "lead" responsibilities for pipeline planning and construction. Generally, field level activities were coordinated through APO, while the Technical Advisory Board (TAB) of the Task Force on Alaskan Oil Development coordinated and facilitated Washington, D.C. level cooperation.[41] TAB was composed of representatives of federal agencies having primary concerns with the project including: Office of Pipeline Safety and the Coast Guard, Department of Transportation; Corps of Engineers; Environmental Protection Agency; and the Geological Survey and Bureau of Land Management, Department of the Interior. JFWAT served as the focus of fish and wildlife interests of the Departments of Commerce (NMFS) and Interior (FWS) as well as the State of Alaska, through its Department of Fish and Game. JFWAT, in turn, was to operate in an advisory capacity to and under the general direction of APO and SPCO.

This inter-governmental strategy of concentrating functions was, by and large, successful in decreasing inefficiencies inherent in situations with multi-agency responsibilities. It must be remembered, however, that it is precisely these "inefficiencies" which provide checks and balances, and multiple points of access and authority, and thereby allow for the simultaneous pursuit of multiple, sometimes conflicting social goals. The coalescing of federal responsibilities in Interior and particularly APO meant that the multiple purposes of government and specifically the goals of timely project completion and environmental protection would be internalized in a single entity. It is worth noting, in this regard, that

> Studies of individual and organizational behavior have demonstrated that the alternative policies and programs that an individual or group considers relevant depend upon the experience and interest of the individual or group; an administrative agency dominated by individuals trained in a particular profession or influenced primarily by one interest group (such as the petroleum industry) will therefore tend not to view as relevant alternative programs that would be considered desirable by an agency dominated by another profession or another interest group.
>
> It is clear that an agency that is run primarily by engineers will have a quite different view of the seriousness of environmental effects and opinions on appropriate programs than an agency, for example, which is operated largely by biologists. Of equal importance, an agency with close ties to fish and game interests will view program possibilities quite differently from an agency with close ties to electric power generating companies.[42]

Every key decision making staff position in the Alaska Pipeline Office (AO, AOR, construction coordinator, AOFR) was held by an engineer throughout the construction phase. (In the summer of 1977, three biologists were given AOFR authority, primarily for restoration activities following construction.) By contrast, general environmental expertise was housed in Ecology and Environment Inc., MRI's environmental subcontractor, while fish and wildlife biologists served in an advisory capacity in JFWAT.

JFWAT existed somewhere between APO and SPCO, serving them both. Because JFWAT was both a state and federal organization, it belonged to neither, but rather took on a life of its own. By and large, its members were successful in leaving their parent agency associations behind, identifying instead with JFWAT and its reponsibilities. It was a single purpose organization, able to focus its attention on a narrowly defined set of goals.

This *de facto* emergence of JFWAT as a separate entity, and its access, however limited, to the sanctions of AS 16 and other statutes did not fundamentally alter either the structure of authority among government monitoring organiations or the functional role JFWAT was to play—it remained essentially an advisory body which operated almost entirely through and with the concurrence of APO and SPCO. JFWAT's status as a separate organization, rather than an in-house staff component of APO or SPCO, did greatly increase its independence and strengthen its bargaining position within government, and allowed for direct access to, and communication with, APO's and SPCO's senior management.

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[41] Testimony of John Latz, technical assistant to the Under Secretary, DOI, before the U.S. House of Representatives, Subcommittee on Public Lands, Committee on Interior and Insular Affairs, *Oversight Hearings on Construction on Trans-Alaska Pipeline*, Washington, D.C., March 11, 1975.

[42] U.S. Senate Committee on Interior and Insular Affairs, Panel Report on Institutional Mechanisms, *Cornell Workshop on Energy and the Environment* (February 22-24, 1972). Committee Print, May, 1972, p. 168.

Chapter VI — Government Surveillance Operations

Government surveillance operations during pipeline construction fell into two broad categories: design review and construction monitoring. Design review included evaluation of preliminary designs, quality assurance program plans, applications for "notices to proceed" (NTPS), and requests for design changes. Construction monitoring consisted of field reviews of construction activities and related documentation functions.

This chapter discusses the processes involved in design review and construction monitoring, including both the procedural requirements and their execution by government surveillance bodies, with particular reference to how they affected fish and wildlife protection generally and the role played by the Joint Fish and Wildlife Advisory Team. It explores the explicit and implicit policies and other conditioning factors which shaped that effort and ends with an account of major findings and conclusions.

Design Review

Although the process of review and approval of Alyeska's designs officially began in 1974, considerable interchange had already taken place by the time the federal Agreement and Grant of Right-of-Way was signed. Over the previous several years, progress had been made toward a common understanding by industry and government as to what would be required in design. The development of environmental performance criteria began in 1969, with early drafts of stipulations, and proceeded throughout the pre-permit period. This work in Alaska was centered in the BLM pipeline division. The first major integrated design document was the project description, issued in July 1971, and it became the focus around which much of this early review work centered.

The procedural and substantive requirements for design submissions were set forth in the right-of-way agreements. Prior to any construction activities, Alyeska was required to:

1. In cooperation with state and federal officers, "agree to a schedule for the time, scope, and quantity of .[preliminary design submissions and notice to proceed applications]. . .to assure that permittees' submissions and applications shall be reasonable in scope, and filed in a reasonable time frame, insofar as the workload thereby imposed on . . .[state and federal pipeline office staffs]. . .is concerned;
2. Submit preliminary designs for each construction segment to the appropriate state and/or federal pipeline offices for review and approval;
3. Submit a time scaled Summary Network Analysis Diagram for the entire project;[1]
4. Submit for review and approval plans for a comprehensive quality assurance program "designed to assure that the environmental and technical stipulations . . .will be fully complied with throughout all phases of construction, operation, maintenance and termination of the Pipeline System";[2] and
5. Apply for a Notice to Proceed to the appropriate state and/or federal pipeline office(s) for review and approval.[3]

Preliminary Design Submissions

The first major design interface between Alyeska and government pipeline offices was the submission for review of preliminary designs for each construction segment of the project. Preliminary design submissions were to be reviewed within thirty days and either approved or granted a waiver prior to submission of applications for notices to proceed (NTPs).[4]

> Preliminary design means the establishment of project criteria (i.e., construction, including design and operational concepts) necessary to delineate the project to be constructed. As a minimum, it includes the following: design criteria and project concepts; evaluation of field data used to establish the design criteria; drawings showing functional and technical requirements; reports of all test data compiled during the data collection and preliminary design evaluation; design drawings (if applicable) or drawings to support structural design concepts of each typical facility or structure; Proposed Construction Mode; outline of project specifications; sample computations to support the design concepts and basis for project siting.[5]

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[1] Stipulations 1.7.1.4; 1.7.2.1; 1.7.3.1. See Appendix A for a listing of stipulations applied for protection of fish and wildlife.

[2] Federal *Agreement and Grant of Right-of-Way* Section 9, paralleled by state *Right-of-Way Lease*, Section 16.

[3] Stipulation 1.7.1.1.

[4] Stipulations 1.7.2.1; 1.7.4.1.

[5] Stipulation 1.1.1.23.

Much of the preliminary design review for the pipeline and roads took place in Houston, Texas, and in Los Angeles, California, for pump stations, Valdez terminal, and communications system. This was due to the location of industry's design efforts in those cities, including libraries for supporting documents.

Preliminary designs consisted of *Criteria and Design Bases*, formally submitted in March 1974, and two preliminary design packages — one for pipeline and roads, the other for pump stations and terminal — submitted in late May. Mechanics Research Inc.'s (MRI) interim report on the preliminary design submittal for pipeline and roads was completed in mid-June and was transmitted to the Alaska Pipeline Office (APO) for continuing review. The package was "approved except as noted" on July 12, 1974. "The Approved Except as Noted concept expresses the Government's reservations to some special concerns which will be more closely scrutinized in the . . .Notice to Proceed packages . . ."[6] Says an MRI official, "Our client [APO] saw the requirement for preliminary design submission as being for the benefit of Alyeska. The real emphasis was to be on final design submissions."[7]

Because JFWAT was not organized until late May 1974, review of preliminary design submissions for fish and wildlife concerns was largely the responsibility of APO's fisheries and game biologists, although Ecology and Environment's (EEI) review covered numerous items of major importance to fish and wildlife resources.

In contrast to the interdisciplinary review of all items received in BLM's pipeline division during the pre-permit phase, preliminary design reviews were highly compartmentalized with separate review groups seeing only those portions assigned to them.[8] Responding to the Interior Department's "request for proposal" for a technical services contractor, MRI had anticipated making a "systems study" of the entire project to identify critical environmental and technical areas that would later be subject to "spot check" design review and/or field monitoring. Probably due to time constraints, APO management decided against the idea.[9]

A number of technical services contractors and APO reviewers state that preliminary design review was largely *pro forma* since the design was already well advanced — close to final design in several areas — and, consequently, government review comments could not effectively be used as inputs to final design.[10]

Preliminary design review was essentially a negotiation process. Its aim was to demonstrate to government monitoring offices (and they, in turn, to assure) that the design concepts were adequate to meet all technical and environmental stipulations. Much of the process occurred *de facto* prior to 1974.

An MRI-contracted study of the government monitoring experience concluded in part that the design review process "did not put enough emphasis on introducing environmental, and particularly ecological, criteria for impact abatement into the preliminary design concepts," and noted that the procedure did not allow sufficient lead time to affect design implementation in those cases where implementation was "governed by long lead times for the supply and delivery of material and equipment."[11] The above suggests that greater emphasis and lead time should be given preliminary design reviews for future projects.

Notice to Proceed Applications

A "notice to proceed" (NTP) was the basic document issued by the authorized officer (AO) or state pipeline coordinator (SPC) authorizing construction for the particular construction segment therein described[12] and was issued after the submission of a "notice to proceed application" (NTPA). The governing NTP, together with all applicable stipulations, constituted the controlling documents for both industrial and government surveillance efforts.

NTPA submissions consisted of:

(1) a final design;

(2) all reports and results of environmental studies considered in that design;

(3) any additional data required to demonstrate how stipulations would be complied with;

(4) a schedule of work and additional submissions for NTPAs and other permits required in the construction segment (section);

(5) a map; and

(6) any other data required by the AO.[13]

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[6] Alaska Pipeline Office, "Comments – Preliminary Design Review" [for pipeline and access roads], July 12, 1974.

[7] Interview with Richard Wolf, MRI, Anchorage, August 23, 1977.

[8] Interviews with James Hemming, JFWAT federal coordinator, August 31, 1977; Bob King, EEI, August 23, 1977; and others.

[9] Interview with Richard Wolf, MRI, August 23, 1977.

[10] Interviews with Dwight Hovland, APO, August 20, 1977; Richard Wolf, MRI deputy project director, August 23, 1977; Robert King, EEI, August 23, 1977.

[11] Terminus Limited, *Trans-Alaska Pipeline—Special Report*, Updated Interim Report, August 1977. (Hereinafter cited as Terminus Limited, *Special Report*.)

[12] Stipulation 1.7.1.1.

[13] Stipulation 1.7.4.3.

Following submission by Alyeska, NTPAs had to be approved, rejected, or returned for modification or additional supporting data within 90 days.[14]

The first NTPAs for right-of-way clearing were submitted in September 1974, with some river crossing NTPAs following in October and most of the remainder submitted from November 1974, through January 1975.[15] By the end of September 1975, 679 NTPs had been reviewed and approved by APO and SPCO. Average review periods were 70 days for APO and 65 days for SPCO.[16]

Alyeska could, and frequently did, request variances from specific stipulations at the time an NTPA was submitted. Such requests were to include justification and any other back-up information required by the state or federal pipeline officer.

NTPAs were sorted and distributed to staff elements (including JFWAT, MRI, and its subcontractors) according to required expertise. Following review by JFWAT, the technical support contractor and the technical staff, APO (or SPCO) attached any special conditions which were required and issued the NTP to Alyeska. NTPs required a subsequent "turn on" in the field by the authorized officer's field representative (AOFR) or field surveillance officer (FSO). This requirement allowed for confirmation of expected field conditions prior to commencement of work.

Especially in the early stages, a large percentage of NTPAs were not deemed acceptable. Problems included conflicts with approved preliminary design criteria or data, inaccurate construction scheduling, and insufficient detail or back-up data. Particularly significant was the lack of adequate hydrological profiles—especially for meandering rivers with wide flood plains — to support river crossing NTPAs.[17] Alyeska's problems with NTPA approval were not limited to the early start-up period. Throughout 1975

> Alyeska was often required to alter or completely change the design of a particular site to insure pipeline integrity and protect environmental amenities, such as visual impact, soil erosion potential, and fisheries impact.
>
> River crossing NTPs continued to be the pacing items in the number of applications pending review and approval, mostly due to lack of sufficient back-up data to support proposed design construction.[18]

JFWAT's design review staff of four began work on *Criteria and Design Base* documents in the summer of 1974, but switched their primary effort to NTPAs when the first submissions came several weeks later. Initially, JFWAT was forwarded only those NTPAs with obvious and substantial fish and wildlife concerns. Later it was discovered that other applications, which had escaped notice during preliminary screening, had significant implications for, or potential impacts upon, these resources. Subsequently, JFWAT requested and received all design submissions for review.[19]

JFWAT's review process, like many other elements of the project, took some time before it came "up to speed." In addition to the discovery that many important fish and wildlife issues were frequently buried in apparently unrelated and voluminous technical engineering documents, it took some weeks for JFWAT to develop a systematic review process and to gain an understanding of what would be required.

Because the government requirements for big game passage were explicit, relatively straightforward and generally understood, JFWAT's NTPA reviews focused largely upon aquatic systems, including stream crossings, flood-plain material and disposal sites, river training structures and others.

Considerable time pressures were put on reviewers (JFWAT as well as other monitoring elements) to submit comments within specified times, which sometimes resulted in a more superficial review than was desired. In some cases, this was caused by internal time frames which were more stringent than the 90 days allowed by the stipulations, but was also a result of an uneven flow of NTPAs from Alyeska, without a corresponding flexibility in review staff size.[20] In addition,

> The Permittees scheduled the filing of most of their NTP applications 90 days prior to the scheduled start of the various construction activities in the field. This approach by the Permittees put extremely heavy workloads on the [governmental monitoring] organizations. Even when filed, the NTP applications often lacked supporting information, which forced the AO to give conditional approvals and in turn increased the review effort and the paper work.[21]

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[14] Stipulation 1.7.4.5.

[15] Interview with Richard Wolf, MRI, August 23, 1977.

[16] U.S. Comptroller General, General Accounting Office, *Trans-Alaska Oil Pipeline — Progress of Construction Through November 1975*, February 17, 1976.

[17] Interviews with Richard Wolf, MRI, August 23, 1977, and others.

[18] State Pipeline Coordinator's Office, *1975 Annual Report*, January 30, 1976.

[19] Interview with James Hemming, JFWAT federal coordinator, August 31, 1977

[20] Interviews with Nancy Kavanagh, JFWAT, August 30, 1977; Roger Post, EEI, August 23, 1977; and others. See also Dave Norton, "Pipeline Surveillance from the Inside," *Alaska Conservation Review*, XVI (2/3), Summer-Fall 1975; and Terminus Limited, *Special Report*, August 1977.

[21] Terminus Limited, *Special Report*, August 1977.

It should be noted that one of the stipulations provided that the authorized officer (AO) could require additional data and, in such cases, the 90 day review period would begin upon receipt of that data. This provision could be invoked when the AO felt the situation warranted it.[22] On the other hand, the congressional mandate for prompt pipeline completion, and the highly sequential nature of pipeline construction, undoubtedly gave considerable leverage to such tactics of the permittee. APO often gave tentative approval to NTPAs that lacked adequate back-up data.[23] In some cases, hurried reviews resulted in NTPs being issued without providing for such things as required construction "windows," which limited construction in certain areas (e.g., fish streams) to non-critical periods, and they had to be subsequently amended.[24] In spite of the foregoing, most interviewees believe sufficient time was available to review NTPAs in the majority of cases.

Ecology and Environment Inc. (EEI) and JFWAT share the common perception that APO management gave major emphasis to technical and engineering questions during NTPA (and design change request) reviews and was generally unresponsive to the comments and recommendations of environmental specialists.[25] JFWAT recommendations for environmental conditions to be attached to the NTP were frequently rejected, the reasons most frequently cited being:

1. the requested conditions were also project stipulations and, therefore, unnecessary and redundant; or
2. the requested conditions were within the discretion of the AOFR and should be requested in the field.[26]

In general, the design review process leading up to issuance of notices to proceed was accomplished under substantial time pressures and, at least in the case of preliminary designs, did not result in an entirely acceptable document. The design review process and related negotiations were not able to secure an effective quality program from the permittees as discussed in the previous chapter.

Neither, it would appear, were fish and wildlife interests effectively accommodated in the preliminary and final design review process. This point, however, requires some qualification, as many of the most important fish and wildlife criteria, including the establishment of big game crossings and culvert velocity standards, and particularly the establishment of critical periods and areas for fish and game resources (i.e., construction "windows") pursuant to stipulation 2.5.3.1, were addressed somewhat outside the process described above. Furthermore, APO's reluctance to include NTP conditions requested by JFWAT, while indicative, perhaps, of a general attitude toward fish and wildlife interests, did not in and of itself constitute a repudiation of those concerns but rather a deferral to the field level. Partly in response to this situation, the state side of JFWAT decided to issue permits for activities affecting anadromous fish streams at the field level in conjunction with AOFRs' field turn-ons, instead of attaching them to the NTPs as originally intended. This procedure allowed for a last-minute field assessment before issuance and for that reason probably better served JFWAT's interests. Typically, the JFWAT monitor would attach any conditions he thought necessary to the permit at that time.

Design Changes

Alyeska experienced numerous occasions when a final design for which an NTP had already been issued had to be changed. The reasons for those design changes fell into three broad classes:

(1) unanticipated field conditions required a variation from approved final design or related specifications;
(2) what the execution contractor built in the field was at variance with the final design as approved in the NTP; or
(3) Alyeska or their contractors encountered opportunities to increase cost effectiveness (relatively rare).[27]

Amending an NTP by the design change process could be initiated either by Alyeska or by the AO (or SPC), but in practice, design changes were usually initiated by Alyeska.

Reviews of design changes were based on one of two controlling documents: field engineering change notices (FECNs) or design change requests (DCRs). Due to variable site conditions, Alyeska's field engineers were given latitude in adjusting final designs to actual conditions.

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[22] Stipulation 1.7.4.6.

[23] Interviews with Morris J. Turner, acting AO, August 29, 1977; Larry Brickman, EEI, August 30, 1977; and Roger Post, EEI, August 23, 1977.

[24] Interview with Nancy Kavanagh, JFWAT, August 30, 1977.

[25] Interviews with Roger Gray, EEI project manager, July 12, 1977; Bob King, EEI, August 23, 1977; Nancy Kavanagh, JFWAT, August 30, 1977; and Allan Carson, JFWAT, state supervisor, October 17, 1977. Also Dave Norton, "Pipeline Surveillance from the Inside," *Alaska Conservation Review*, XVI (2/3), Summer-Fall 1975. For historical perspective see Chapter IV, this report.

[26] Interviews with Allan Carson, JFWAT state supervisor, October 17, 1977; and Nancy Kavanagh, JFWAT, August 30, 1977.

[27] Interview with Morris Turner, AOR, October 20, 1976.

When a field evaluation resulted in a finding that site conditions were inconsistent with the approved design and within discretionary authority of field engineering to redesign, or if the as-build condition was at variance with final design, Alyeska's field engineering submitted the redesign as a FECN to the government field chiefs for review and approval. When the AOFR determined (frequently after consulting the authorized officer's representative or construction coordinator by phone) that the FECN was acceptable, he gave approval in the field and construction continued. FECNs affecting fish and wildlife resources (e.g., for work affecting streams) generally resulted in advice from a JFWAT field biologist to the AOFR prior to his determination of acceptability. If the AOFR determined that a FECN required a more thorough review, it was sent to the Alaska Pipeline Office for consideration.

In cases where the AOFR found a FECN unacceptable, or if the variance from approved design was beyond the authority or capability of field engineering to redesign, the issue was forwarded to Alyeska engineering in Fairbanks or Anchorage for resolution. Additionally, in some cases, design changes were initiated by Alyeska before going to the field. Redesigns were then sent to the government surveillance agencies as design change requests (DCRs) for review and approval.

APO review of DCRs and FECNs was complicated by two important factors. Because of the sequential nature of pipeline construction, and the generally close timing of construction activities, design changes required prompt review. Secondly, in part due to highly variable site conditions, but for other reasons as well, the number of design changes requiring review was much larger than had been anticipated.[28] As of April 8, 1977, APO had reviewed 2,841 design change documents.[29]

Like "notice to proceed" applications, DCRs and FECNs were initially screened by APO and routed to staff elements including MRI and JFWAT, according to required expertise. Reviewers usually then had 24 hours to return comments for consideration before a response was sent to Alyeska. Because of the large number of documents and short time frames involved, the screening process was not always sufficiently discriminating to insure all items relevant to fish and wildlife resources were reviewed by JFWAT.[30] In addition, review documents frequently lacked sufficient information to thoroughly evaluate the proposed action.[31]

After a period of receiving only those design changes obviously affecting fish and wildlife, JFWAT requested and received all future DCRs and FECNs so that less obviously related items could be reviewed.[32] JFWAT experienced some difficulty in getting their comments included in APO's responses — as many as 40 to 50 percent were initially excluded —and there were several APO-JFWAT meetings on the issue throughout the construction phase.[33] It is uncertain whether the problem was a result of the sheer volume and time constraints involved or if it was one of disagreement, but initially APO frequently cited problems with receiving JFWAT comments within the allotted time.[34] Whatever the reason, JFWAT later stamped all design change documents with the date and time of receipt, thereby insuring and documenting that the 24-hour turn around requirement was met. Thereafter, conflict over inclusion of JFWAT comments was reduced, but not entirely obviated.[35]

The design change request or field engineering change notice, then, was an amendment to an existing notice to proceed and was reviewed in a similar manner, including JFWAT review, but in a much shortened time.

JFWAT had trouble catching up with the demands of the design review process, both internally and in its relationships with APO and SPCO. The process eventually proved useful to JFWAT, however, as a means of identifying inadequate design elements and bringing them to the attention of APO and SPCO, and for flagging potential problems for subsequent field monitoring.

Construction Monitoring

In addition to review and approval of various design submissions for compliance with the right-of-way agreements, stipulations and other requirements, government surveillance organizations were charged with monitoring construction activities to assure compliance in the field. The strategy employed was to "spot check" various construction elements as a means of monitoring the efficiency of Alyeska's quality program, which in turn had the primary responsibility of assuring compliance by the execution contractors.

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[28] This was affirmed in several interviews: James Hemming, JFWAT federal coordinator, August 31, 1977; Nancy Kavanagh, JFWAT, August 30, 1977. See also SPCO *Annual Reports*, 1975 and 1976.

[29] Telephone communication, Arlan Kohl, APO technical staff coordinator, April 11, 1977.

[30] Interviews with Richard Wolf, MRI, August 30, 1977; and Nancy Kavanagh, JFWAT, August 30, 1977.

[31] Interview with Richard Wolf, MRI, August 30,1977.

[32] Interview with Nancy Kavanagh, JFWAT, August 30, 1977.

[33] Ibid.

[34] Ibid.

[35] Ibid.

Although Alyeska's quality assurance/ quality control (QA/QC) program improved significantly over the life of the project, the Alaska Pipeline Office (APO) never really succeeded in its attempts to make that program fulfill its intended role. As a result, government monitoring agencies had to increase their level of field coverage beyond that anticipated and for which they were staffed. In the case of JFWAT, this amounted to virtually assuming the fish and wildlife QC function.[36]

Field Structure and Operation

Typically, a federal surveillance team in a construction section consisted of one authorized officer's field representative (AOFR), one Mechanics Research Inc. (MRI) area engineer, one Gulf Interstate Engineering (GIE) engineer, and one Ecology and Environment Inc. (EEI) environmentalist. The AOFRs were advised on fish and wildlife matters by JFWAT biologists who were either state or federal employees. In addition, each construction section with state land had a state field surveillance officer (FSO) who was advised by the same JFWAT biologists. Only the AOFRs and FSOs were authorized to communicate officially with Alyeska. They were the sole spokesmen for the authorized officer and state pipeline coordinator, respectively, and all field level decisions were subject to their review and approval.

JFWAT field biologists served as advisors to the AOFRs and FSOs on matters involving, directly or indirectly, fish and wildlife populations and their habitats. All action requests and communications from JFWAT to Alyeska went through the AOFRs or FSOs and were subject to their approval. Under Alaska Stature 16.05.870, JFWAT representatives were responsible for issuing advisory memos approving in-stream work, together with any conditions they considered necessary. The actual AS 16 permit was issued subsequently by JFWAT's state supervisor. JFWAT field biologists also had the latitude of recommending, through the state supervisor, legal action directly against Alyeska for violations of that act. In a few cases, such legal action was taken by the state.[37]

From May 1974 to mid-summer 1976, JFWAT was organized around two offices — one in Anchorage which handled most administrative responsibilities, design review, and field monitoring in the southern sections, and another in Fairbanks which was the base for some field monitoring activities in the northern sections and for several technical evaluation studies. Initially, the JFWAT state supervisor was also located in Fairbanks. When this supervisor resigned in the summer of 1975, all management functions were consolidated in the Anchorage office. In the summer of 1976, those administrative functions that had remained in Fairbanks were also moved to Anchorage. Thereafter, the only official JFWAT functions remaining in Fairbanks were certain technical evaluation studies.

JFWAT field biologists worked a 9-1-4 schedule — nine days in the field, one day in the office and four days off. The office day was spent writing "narrative surveillance reports" of their field activities and attending a weekly staff meeting during which problems and developments in each section were discussed. These staff meetings served to keep JFWAT's management, technical staff and field staff informed of current activities at both the Anchorage and field levels and provided an opportunity to discuss policy and decide on courses of action.

JFWAT's effectiveness in helping protect fish and wildlife values was conditioned by the general hierarchy of priorities established by APO management. Although we found no written document explicitly outlining those priorities, interviews with APO, technical support contractor, and JFWAT personnel, as well as the overall tone of the documentation reviewed for this study, consistently indicate that APO's priorities were: (1) system integrity, (2) expeditious completion of the project, and (3) environmental protection. By contrast, JFWAT considered environmental protection to be more important than expeditious construction (but not more important than system integrity). This contrast reflects not only the differing nature of the two organizations (JFWAT's charge was limited to the protection of fish and wildlife resources), but also a differing philosophy toward stipulations enforcement.

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[36] Memorandum from technical staff coordinator to AOR, Subject: "Non Welding Quality Control Concerns," May 28, 1976; letter from Kent Frizzell, Under Secretary, DOI, to Senator J. Bennett Johnston, September 17, 1976, responding to questions of Senator Ted Stevens during U.S. Senate, Committee on Interior and Insular Affairs, *The Construction of the Trans-Alaska Pipeline system, Hearing*, 94th Cong., 2 Sess., July 21, 1976.

[37] Beau Bassett, Trustees for Alaska, "A Legal Analysis of Major Federal and State Fish and Wildlife and Environmental Protection Statutes as Applied in Surveillance of the Trans-Alaska Pipeline," September 21, 1977. (Background paper prepared in support of this report.)

Generally speaking, JFWAT favored strict enforcement of the stipulations both to provide maximum protection for the resource and to impress upon Alyeska and its contractors that environmental protection was to be taken seriously. AOFRs, on the other hand, tended to favor a more flexible policy of application, making allowances for both construction progress and cost. In the end, JFWAT's federal coordinator concluded that the biologists got most of the things "dearest to our hearts . . . but it took more headaches than it should have."[38]

Government construction monitoring on federal lands involved three distinct documentation systems: (1) AOFR field memos and daily logs, (2) technical support contractor's spot check reports/remedial action reports, and (3) JFWAT advisory memos and narrative surveillance reports.

Field memos were the official vehicle for communications from the AOFR to Alyeska authorizing, directing, or requesting various actions, including notifications of non-conformance with stipulations (NCR). In addition, AOFRs frequently communicated verbally with Alyeska and, unofficially, with execution contractors. Interviews and documentation suggest there was considerable variation among AOFRs as to the degree to which they relied on verbal rather than written communications, including the issuance of non-conformance field memos. One AOFR wrote only two field memos for non-conformance with stipulations throughout construction, while another wrote "two thick stacks."[39] The reasons for such wide variations in the documentation record were not determined.[40] In addition to field memos, the AOFRs also kept daily logs for each section, in which they summarized significant activities in a diary format.

Mechanics Research Inc.'s area engineer in each construction section generally directed the monitoring activities of EEI and GIE in the field, and spot check reports by subcontractors were reviewed and approved by him before being forwarded to the AOFR. Spot checks reporting non-conformances were to be monitored for corrective actions. These repeat spot checks were called remedial action reports. Like JFWAT, MRI and its subcontractors served in an advisory capacity to the AOFR.

JFWAT advisory memos served to keep the AOFRs (and FSOs) informed of the status of important fish and wildlife items, and to approve stream-related work subject to Alaska Statute 16 permit requirements.[41] Advisory memos directed to Alyeska required the approval of the AOFR and were forwarded by him, usually attached to a field memo, which sometimes contained additional comments or directions.

JFWAT had no overall or consistent policy for writing non-conformance advisory memos, generally known as non-conformance reports (NCRs), and considerable variation was exhibited among monitors in both the number written and kinds of violations cited. For example, some monitors seldom wrote NCRs for non-correctable violations (e.g., unauthorized fording of a stream by construction equipment) unless the impact was serious; others handled smaller correctable problems verbally with the AOFRs. On the other hand, some monitors felt that every observed violation should be documented and brought to the AOFRs' attention. One JFWAT biologist estimated he wrote only one-fifth as many NCRs as some other monitors.[42]

JFWAT monitors also wrote narrative surveillance reports at the close of each tour of duty. The reports summarized the most significant construction activities for fish and wildlife concerns, commented on continuing problem areas, summarized important advisory memos issued, and noted significant fish and wildlife observations. Copies of advisory memos were usually attached. Items addressed in the narrative surveillance reports were usually elaborated upon during JFWAT's weekly staff meetings, which were recorded.

The documentation systems employed by APO and JFWAT were not intended to, nor do they, provide a full historical account of activities. It is usually impossible to reconstruct the history of, for example, a particular stream crossing, unless there were sufficient problems to attract considerable attention from monitors.[43] The

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[38] Interview with James Hemming, JFWAT federal coordinator, August 31, 1977.

[39] Interviews with AOFRs, August 1977.

[40] A number of AOFRs did, however, comment that verbal communications did not engender as much resentment on the part of construction personnel as did written directives.

[41] As indicated elsewhere, the actual permit issued by JFWAT's state supervisor for the Commissioner, Alaska Department of Fish and Game.

[42] Interview with JFWAT monitor, August 1977.

[43] See "Stream Crossing Histories," Chapter VII.

AOFR daily logs provide the fullest available account of construction, but suffer from insufficient reference detail—places frequently referred to by names adopted during construction, for example.

The field-level documentation systems initially were neither designed, nor managed, to provide an auditable record. Among other things, it was frequently difficult to "track" open non-conformance reports or verify their current status. This presented some problems for monitors and even greater difficulties for those who have been charged at various times with evaluating APO's operation.[44]

The scheduling of monitoring efforts was generally dictated by the daily progress of construction, with only limited opportunities to plan activities more than a day or two in advance. JFWAT monitors were essentially self-directed, their daily routine being determined by those construction areas and activities which they considered to be most significant for fish and wildlife. In addition, they were sometimes directed by JFWAT's management to pay particular attention to one area or class of problem (e.g., low water crossings, a particular river crossing) and were also expected to respond to AOFR (or FSO) requests for information or monitoring coverage when possible.

JFWAT field biologists' primary job was to monitor compliance with the project stipulations[45] as they related to fish and wildlife resources, and to keep their AOFRs (and FSOs) advised of same.

Day-to-day field monitoring and documentation by JFWAT and other government inspectors was neither systematic nor representative of actual construction practices in a statistical sense. Monitors usually tried to focus their attention on those activities of greatest significance for pipeline integrity and/or the environment. Likewise, there was a tendency to focus documentation efforts on violations or potential problem areas, rather than to divert limited resources to documenting compliance situations. Consequently, except in cases where systematic surveys or audits were performed (e.g., welding certification, big game crossing surveys), statistical summaries of conformances and non-conformances as a function of total documented inspections are of limited value. Comparisons of non-conformances by type of violation, however, can suggest the general distribution of problems. JFWAT non-conformance advisory memos, by type of violation, are shown below for the period of June 1974 through October 1976, in a chart compiled by JFWAT:

Type of Nonconformance	*Percent of Nonconformances*	*Cumulative Percent*
1. Erosion, siltation	27.4	27.4
2. Fish passage blocks	16.3	43.7
3. Unauthorized in-stream activities	14.7	58.4
4. Unauthorized disposal of waste; garbage and toxic substances	12.6	71.0
5. Lack of restoration of disturbed areas	7.4	78.4
6. Oil spills	6.1	84.5
7. Water use	5.8	90.3
8. Big game crossings	3.2	93.5
9. Miscellaneous	6.5	100

This chart represents 665 instances of nonconformance with stipulations, of which 215 (32 percent) were classed "noncorrectable" by JFWAT.

The most significant observation to be made from this table is that the three most frequent classes of violations, accounting for 58 percent of all non-conformances (NCRs) issued by JFWAT, involved aquatic systems. Control of erosion and stream sedimentation were major problems during construction. These were identified not only by JFWAT (and EEI) field documentation, but also by a number of more general assessments of construction.[46] "Much of the erosion and siltation was caused by a lack of integration of basic erosion control techniques with construction."[47] Blocks to fish passage were usually the result of poorly placed or inadequately sized culverts, improperly constructed low water crossings (reinforced fords), or degradation of low water crossings resulting from improper use or lack of maintenance.

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[44] For a more detailed discussion of APO documentation see: Price Waterhouse and Co., Alaska Pipeline Office: *Recommendations for Improving the Effectiveness of the Systems Designed to Monitor Alyeska's Compliance with the Right-of-Way Agreement*, October 8, 1976. This study was contracted by MRI pursuant to APO Work Order 159 of August 27, 1976 and forwarded to APO via: Memorandum to Morris Turner from Michael Sullivan, MRI manager, administration, November 16, 1976; and U.S. Department of the Interior, Office of Audit and Investigation, *Study of the Alaska Pipeline Office Monitoring of Quality Assurance and Control by the Alyeska Pipeline Service Company*, September 10, 1976.

[45] The stipulations relevant to the subject matter of this report are included as Appendix A.

[46] U.S. Comptroller General, General Accounting office, *Trans-Alaska Oil Pipeline—Progress of Construction through November 1975*, February 17, 1976; and, *Trans-Alaska Oil Pipeline-Information on Construction, Technical and Environmental Matters through Spring, 1977*, August 23, 1977. Also, APO Memorandum from technical staff coordinator to AOR, Subject: "Non-Welding Quality Control Concerns," May 28, 1976; MRI, "Possible Reoccurring Non-Conformances," October 14, 1976.

[47] From statement of Allan Carson, JFWAT, state surveillance supervisor-JFWAT, before the President's Council on Environmental Quality, *Hearings on Natural Gas Pipeline from Prudhoe Bay, Alaska*, Anchorage, May 16, 1977.

Both erosion/siltation and inadequate fish passage were chronic and diffuse problems throughout construction. Individual violations generally were undramatic, and their significance for fish productivity was not widely appreciated. Consequently, they did not demand quick corrective action by either AOFRs or execution contractors. By contrast, highly visible violations such as oil spills or unauthorized in-stream use of equipment usually received prompt attention. This problem is not unique, of course, and it is a truism that seemingly minor incidents would not usually receive the attention accorded more obvious or less frequent events. It does, however, suggest that for future projects greater emphasis should be placed on resolving chronic problems which, like siltation and fish passage, could have significant long-term impacts on fish or wildlife populations or on the productivity of their supporting systems.

APO Sanctions

The Alaska Pipeline Office (APO) had five levels of control or sanction for the enforcement of project conditions:

1. review and approval of design documents and the power to impose conditions on notices to proceed;
2. the administrative requirement that notices to proceed (NTPs) would be subject to AOFR approval by field memo ("field turn-on") prior to commencement of work;
3. authority of the AOFR to issue non-conformance field memos and to require correction by Alyeska;
4. authority to issue stop work orders; and
5. authority to have outside contractors perform remedial work at Alyeska's expense.

In addition, the Secretary of the Interior had at least nominal legal authority under the Mineral Leasing Act of 1920, to terminate the right-of-way for "non-compliance with any provision of [Section 28 of that Act],"[48] however improbable its application.

The use of field turn-ons served "to ensure that the conditions stipulated [were] met and to similarly ensure that the AOFR [was] appraised of all current on-going activities."[49] In addition, field turn-ons assured the AOFR an opportunity to confirm that field conditions reasonably approximated those anticipated in the NTP's final design. They also served as vehicles for JFWAT advisory memos approving in-stream work under Alaska Statute 16 permit requirements. The use of field turn-ons is also noteworthy in that, like design review, it was a point of control where government monitoring efforts could operate preventively by affording the AOFR and the JFWAT field biologist an opportunity to identify potential problems prior to construction activities. Non-conformance field memos and stop work orders, on the other hand, came into play after provisions of project conditions were violated and those violations were brought to the AOFR's attention

Violations of project conditions, including stipulations violations and deviations from approved designs or specifications, were communicated to the AOFRs by means of non-conformance spot check reports or advisory memos.[50] If an AOFR concurred with a finding or if he discovered such a violation and it was "correctable," he would contact Alyeska's field representative orally to inform him of the problem and request remedial action. If the condition was not corrected to the AOFR's satisfaction after oral notification, it became a non-conformance. Notification of a non-conformance was to be by written field memo.[51] As indicated earlier, there was enormous variation in the use of NCR field memos by AOFRs.

Stop work orders were provided for by the right-of-way agreement and could be issued "if, in the judgment of the authorized officer:

> 1. An immediate temporary suspension of such activities is necessary to protect: (a) public health or safety (including, but not limited to, personal injury or loss of life with respect to any Person or Persons); or (b) the environment from immediate, serious, substantial, and irreparable harm or damage to areas of vegetation or timber, fish, or other wildlife populations or their habitats, or any other natural resource); or
> 2. Permittees, their respective agents, employees, contractors or subcontractors (on any tier) are failing or refusing, or have failed or refused, to comply with or observe: (a) any provision of this Agreement necessary to protect public health, safety, or the environment; or (b) any order of the authorized officer implementing any such provision of this Agreement or of any other agreement, permit, or authorization that shall have been duly approved, issued, or granted by the Scretary in connection with all or any part of the Pipeline System.[52]

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[48] Public Law 93-153, Title I, section 101 (O) (1).

[49] Letter from Andrew Rollins, AO, to Alyeska Pipeline Service Company and the Commissioner, Alaska Department of Highways, Subject: "The authorities of AOFRs," June 10, 1974.

[50] General procedures for non-conformances are outlined in Memorandum to AOFRs from construction coordinator, Subject: "Spot Checks-NCRs," May 1, 1975; memorandum to AOFRs, MRI, JFWAT from construction coordinator, Subject: "Field Surveillance Procedures," April 30, 1975.

[51] Memorandum to AOFRs from construction coordinator, Subject: "Spot checks-NCRs," May 1, 1975.

[52] *Agreement and Grant of Right-of-Way*, Section 25A.

If, however, a stop work order would shut down construction in an entire construction section and was to be issued under (2) above, the authorized officer also needed the prior written appproval of the Secretary of the Interior.[53]

It is unclear what authority AOFRs had to issue stop work orders without prior clearance from Anchorage. A letter from the AO to Alyeska written in 1974 stated an AOFR "has the authority to shut down segments of the work, but not an entire construction subdivision, without the express consent of the AO and/or AOR."[54] A subsequent directive in the APO Employees Manual, however, reads:

> The AOFR should review Section 25 of the Agreement and Grant of Right-of-Way before recommending the Authorized Officer approve a temporary suspension be issued.[55]

Interviews with members of APO's construction monitoring staff were also contradictory on this point, suggesting a lack of sufficient guidance to monitoring staffs by management.

APO's general policy was to use its stop work authority sparingly. As of mid-August 1977, APO had issued 88 field memos classified as "stop orders."[56] A review of those memos, however, revealed that several were in fact merely threats to stop work if a specified problem were not corrected, while the vast majority directed only that specified non-conforming activities be halted. Only one stop work order addressed a chronic problem directly relating to fish and wildlife resources.[57]

A number of reviews of APO's operating procedures have found that, while the monitoring system as a whole was generally adequate, sanctions, and particularly stop work orders, were not used to the extent they should have been to assure adequate compliance with project stipulations and other conditions. For instance, a survey by a certified public accounting firm[58] submitted to Mechanics Research Inc. in early October 1976 concluded in part:

> [T]he actions taken by personnel appear to have been appropriate, as envisioned in the policy guidelines, with the exception of the use of the Stop Work Order. We found that the Stop Work Order was not always utilized as a result of "urgent" non-compliance reports. We also found that the timeliness of Stop Work Orders and other actions could be improved.[59]

These findings were also echoed by the congressional General Accounting Office's 1977 report on pipeline construction. The GAO found that:

> Federal monitoring data shows that many nonconformances occurred during the 1975 and 1976 construction seasons because of inadequacies in Alyeska's quality assurance program and the Authorized Officer's unwillingness to use proper authority to assure compliance. The Authorized Officer brought these nonconformances to Alyeska's attention but the corrective action was not always initiated in a timely manner.[60]

However, in sharp contrast to the findings quoted above, another study contracted by Mechanics Research Inc. stated:

> It is the conclusion of this analysis that, even though the "power to shut down" is a necessary power, there were few if any instances during the construction of the Trans-Alaska Pipeline where the intent of the Agreement would have been better met or the public and the national interest better served if the AO had exercised his power to shut down. The approach generally taken by the AO was to work out acceptable remedial action.[61]

When JFWAT identified field problems not requiring immediate attention, they were assembled in "punchlists" and transmitted to Alyeska for remedial action. Transmittal of environmental punchlist items was a biannual occurrence, with work to be accomplished either pre-freezeup or pre-breakup — when remedial activities would have minimum impacts upon fisheries resources and construction activities. Typically, Alyeska would make commitments that the work listed would be accomplished, but a substantial portion would not get done. APO would then have to put those items not completed on the next punchlist, Alyeska would commit itself to completion and the work would not be completed.[62] This pattern was repeated from the pre-breakup punchlist of Spring 1975 through the pre-freezeup punchlist for Fall 1976.

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[53] Ibid., subsection B (b).

[54] APO letter to Alyeska Pipeline Service Company and Commissioner, Alaska Department of Highways, from Andrew Rollins, AO, Subject: "Authorities of the AOFRs," June 10,1974.

[55] Memorandum to AOFRs from construction coordinator, Subject: "Spot Checks-NCRs," May 1, 1975.

[56] Alaska Pipeline Office, "APO Stop Orders, " August 12, 1977.

[57] Field Memo 1203, March 25, 1975. Issued in Section 4. That memo directed Alyeska to terminate the use of 55 gallon drum-type storage for culvert thaw devices due to repeated instances of oil contamination of fish streams.

[58] Price Waterhouse and Company, Alaska Pipeline Office: *Recommendations for Improving the Effectiveness of the Systems Designed to Monitor Alyeska's Compliance with the Right-of-Way Agreement*, October 8, 1976. This study was contracted by MRI pursuant to APO Work Order 159 of August 27, 1976 and forwarded to APO via: Memorandum to Morris Turner from Michael Sullivan, MRI manager, administration, November 16, 1976.

[59] Ibid., p. 4.

[60] U.S. Comptroller General, GAO, *Trans-Alaska Oil Pipeline — Information on Construction, Technical, and Environmental Matters through Spring, 1977*, p. 17.

[61] Terminus Limited, *Special Report*, p. 2-9

[62] This pattern was conspicuous in our reviews of AOFR daily field logs and JFWAT narrative surveillance reports and was affirmed in an interview with an APO official, September 1977.

Authorized officer's field representative (AOFR) logs cite four frequent explanations why punchlist items were not completed on time: (1) Alyeska civil engineering did not direct execution contractors to do the work, (2) there was more important, production-related work to be done, (3) required equipment was not available, and (4) there was insufficient bedspace in construction camps available. That is, Alyeska and its contractors did not want to divert resources away from construction to do remedial work, particularly for environmental and other non-production related items.

Finally, in mid-March 1977, the acting authorized officer wrote to Alyeska's president, listing a number of APO concerns — half of them relating to remedial work. The letter stated:

> The most critical current scheduling item from our standpoint is that effort associated with pre-breakup work . . .we want a satisfactory schedule within a week . . .it must provide the mechanism where your quality assurance manager, et al, can in fact judge the progress and acceptability of the work. If we do not receive such a schedule and assurance of pre-breakup work accomplishment, I have no alternative but to shut down all pipeline-related construction except backfilling of the fuel gas line.[63]

Although this elicited a credible response by Alyeska, the letter was sent just a month before breakup and work crews were able to address only JFWAT's first-priority punchlist items.[64]

Subsequently, the Fish and Wildlife Service contingent of JFWAT, having obtained a commitment from their area director to take the issue to the Assistant Secretary's Office if necessary, went with JFWAT's federal coordinator to APO's management in late May. They insisted that Alyeska be required to correct outstanding fish and wildlife related problems on federal lands, arguing that it was the last chance to effectively compel remedial action. The acting AO responded by delegating to two federal JFWAT biologists AOFR authority to monitor stream-related remedial work. He also contacted Alyeska and directed that remedial work be undertaken immediately and that all necessary manpower and equipment be made available.[65]

Problems in getting adequate responses from Alyeska on non-conforming items were not limited to environmental concerns. One AOFR who had written "two thick stacks of NCRs" told us that when he put deadlines for remedial action on field memos, Alyeska met only about half of them.[66] Similarly, the state pipeline coordinator felt that Alyeska was adept at avoiding government's wishes and also at playing state and federal monitoring efforts against each other.[67]

Problems also occurred because Alyeska did not always have adequate control over construction activities.[68] And, there was always the problem of lengthy official lines of communication — (JFWAT-AOFR-Alyeska site representative-execution contractor-foreman-workers; with additional steps common) which frequently resulted, like a parlor game, in significant differences between the original intent and final execution. Indeed, many field engineers regularly communicated with execution contractors unofficially, finding it much more efficient and effective.

There were two additional factors strongly affecting how successfully AOFRs could influence Alyeska's actions: (1) the general policy that Alyeska was to design and build the pipeline, while the role of government was limited to review and approval or disapproval, and (2) the closely-related question of potential liability should an AOFR's actions "unreasonably" cost a contractor money. The most important consequences of these factors for fish and wildlife was in relation to stream crossings. It was much more likely and reasonable that an Alyeska engineer would, in the face of uncertainty, choose, for example, the smaller of two culvert sizes; or, more generally, the least expensive solution to any given problem — a solution which engineers, including AOFRs, by training consistently found more acceptable than biologists who, also by training, were predisposed to err on the side of the fish. Nevertheless, there were occasions when an AOFR might be convinced an approved crossing or other structure or proposed remedial action by Alyeska would probably not be satisfactory. In such cases, the AOFR might advise Alyeska of this; but if Alyeska insisted, there was little the AOFR could do until the structure proved inadequate. In some cases, a single crossing was reworked several times before it met established performance criteria. By way of illustration, in the spring of 1976, one AOFR made the following entry in his field log:

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[63] Letter to William Darch, president, Alyeska Pipeline Service Company, from Morris Turner, acting AO, March 16, 1977.

[64] Informal discussions with James Hemming, JFWAT federal coordinator, Allan Carson, JFWAT state supervisor, late October 1977.

[65] Ibid.

[66] Interview with AOFR, August 1977.

[67] Interview with Charles Champion, state pipeline coordinator, March 18, 1977.

[68] Terry F. Lenzner, *The Management, Planning and Construction of the Trans-Alaska Pipeline System*, Report to the Alaska Pipeline Commission by the Commission's Special Council, August 1, 1977. Also interviews with James Hemming, JFWAT federal coordinator, August 31, 1977; AOFR, August 1977; informal discussion with Keith Morehouse, July 1977.

> Discussion with [an Alyeska engineer] on Sheep Creek. Apparently the pooling and filling of the stream channel is preferred by [him]. I'm tired of this one and intend to let the crossing go through as APSC wishes. If it doesn't hold, I suppose we start again (for the 4th time)![69]

Several AOFRs interviewed also indicated that even in some situations where they had authority to direct that certain actions be taken, they were cautious because if something an AOFR directed did not work and resulted in extra costs to the contractor the AOFR could be held liable. AOFRs did, however, feel free to make verbal "suggestions" to Alyeska, and this was often an effective mode of communication.[70]

APO had adequate sanctions to achieve substantial compliance with project stipulations. Notwithstanding this, APO was unsuccessful in its efforts to get Alyeska to field an adequate quality control program. As a result, JFWAT was placed in the position of having to provide much more intensive monitoring coverage than had been anticipated or for which they were staffed. Furthermore, as a result of the priority APO gave to expeditious construction, fish and wildlife related non-conformances were not corrected in a timely manner. Particularly significant in this regard were chronic problems related to aquatic systems — e.g., violations of siltation/erosion control and fish passage requirements. Nevertheless, APO, at JFWAT's urging, did move aggressively to correct fish and wildlife related problems once pipeline construction was substantially complete.

Biologists and Engineers

Animosity developed between many biologists and engineers—JFWAT monitors and AOFRs — during the course of pipeline construction. This resulted from two distinct but parallel facts: (1) that APO and JFWAT had two essentially different monitoring roles and philosophies; and (2) that biologists and engineers had little understanding or appreciation of each others' disciplines and professional concerns.[71]

JFWAT's biologists were generally unfamiliar with large-scale construction projects and had little or no understanding of engineering and its limitations. As a result, some JFWAT monitors damaged their credibility in the eyes of engineers by (1) being insensitive to costs in their advices to AOFRs (whose professional training emphasizes cost minimization), and (2) being either unable to discriminate or unwilling to let minor or "technical" problems pass and to concentrate instead on more significant violations.

On the other hand, AOFRs generally had little appreciation for the subtleties of biological systems and were uncomfortable with the apparent subjectivity of biological assessments, which had to be made under conditions of uncertainty. Biologists had difficulty convincing AOFRs of the importance of (1) minimizing erosion and siltation, (2) protecting very small but productive fish creeks and (3) maintaining fish passage — particularly for non-game fish — and especially during high flow periods.

Not surprisingly, this mutual lack of understanding resulted in significant differences in how JFWAT monitors and AOFRs interpreted stipulations, such as those calling for continuous fish passage. Several interviews and reviews of the daily field logs indicated a willingness on the part of some AOFRs to substitute their judgment for that of JFWAT monitors in evaluating the significance of problems such as erosion/siltation high-water velocity blocks to fish passage, or inadequate fish passage in very small streams Indeed, several AOFRs explicitly indicated that how they handled reports of violations of fish and wildlife stipulations was in part dependent on who submitted them. In addition, many biologists felt that some AOFRs took such reports as personal affronts, interpreting them as reflections on how adequately the AOFRs were doing their jobs.

JFWAT was a single-purpose organization — its sole mission was to protect fish and wildlife populations and their habitats. Furthermore JFWAT's perception of the role of government monitoring organization could fairly be characterized as being limited to protecting the environment and assuring system integrity viewing Congress' mandate for early project completion as basically an industry responsibility which government must accommodate consistent with environmental protection.

APO on the other hand, was a multi-purpose organization that viewed its charge as being to assure system integrity and prompt construction, as well as to keep environmental and construction costs to a minimum, consistent with the first two criteria. Although only a matter of emphasis, these two viewpoints reflect essential differences between JFWAT and APO throughout design review and construction surveillance.

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[69] Dennis Schroeder, AOFR daily field log, Section 5, April 14, 1976. See also history of Sheep Creek, Appendix C, this report.

[70] Interviews with six AOFRs, Anchorage, August 1977. The AOFRs who discussed this liability of government inspectors were largely referring to past projects monitored by government inspectors of the Corps of Engineers.

[71] Discussion of biologist/engineer positions in this section is based on interviews with AOFRs and JFWAT personnel, Anchorage, August and September 1977. A list of persons interviewed appears at the conclusion of this report.

Conclusions

Government surveillance operations were conducted in two distinct processes: design review and construction monitoring. Design review consisted of two major, separate submissions — preliminary designs and notice to proceed applications (NTPAs). Preliminary designs were reviewed for fish and wildlife aspects by APO's game and fisheries biologists and this process was well advanced by the time JFWAT became operational. NTPAs followed in the fall of 1974 and were reviewed by all surveillance organizations, including JFWAT. In general, JFWAT's efforts to get special conditions attached to NTPs were only moderately successful. Following NTP issuance, responsibility for monitoring Alyeska's efforts for work approved in the NTPs shifted to the field.

Although everyone involved in government surveillance activities considered the design review process a valuable one, APO found it necessary to give less than full approval to several critical submissions. This was because the congressional mandate of the Trans-Alaska Pipeline Authorization Act for expeditious construction was considered sufficiently proscriptive that, unless there was a clear threat to system integrity, APO could not jeopardize the construction schedule for possible problems encountered in the review of Alyeska's plans. As a result, preliminary design packages were "approved except as noted"; Alyeska's quality program was "tentatively approved"; and several NTPAs were "conditionally approved."

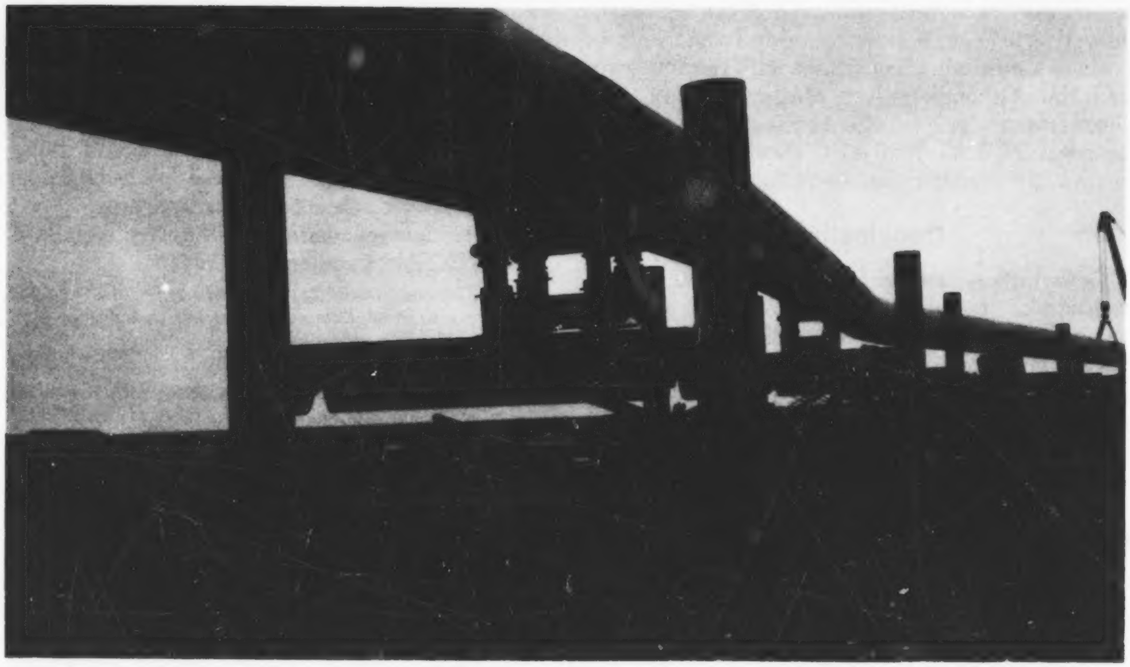
There was one other class of design documents requiring review — design change requests (DCRs). These were essentially amendments to approved NTPs and numbered nearly 3,000 during construction. Because they were usually submitted just prior to the subject construction activity, reviewers typically had only 24 hours to respond.

Government field monitoring was organized around the six government surveillance sections, with one "team" on duty in each section at any one time. A full monitoring contingent would consist of one AOFR, representatives of the technical support contractor and JFWAT monitor. If state land was involved, there would also be a field surveillance officer (FSO).

JFWAT monitors served in an advisory capacity to AOFRs and FSOs, and all official communications to Alyeska were directed through them and were subject to their approval.

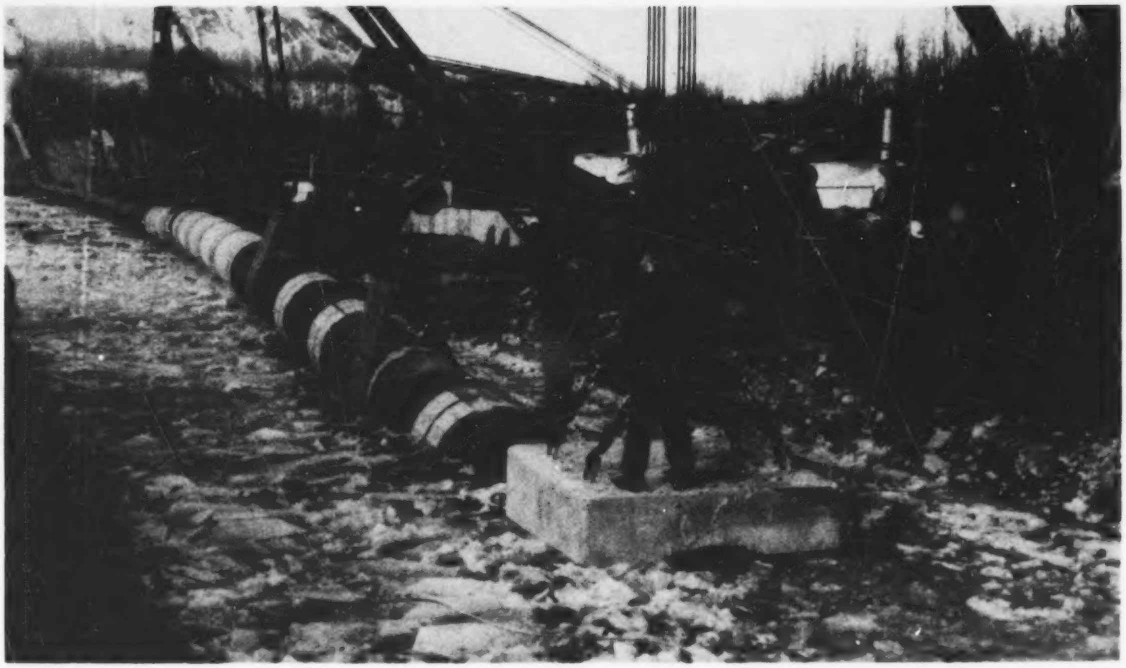
Several factors conditioned the effectiveness of JFWAT's field monitoring efforts:

1. The overall priority of monitoring efforts set by APO placed greater emphasis on timely construction than environmental protection.
2. Alyeska did not field an effective quality assurance and control program, particularly with respect to environmental quality control. As a result, JFWAT field monitors had to assume a much larger role than had been anticipated, and environmental protection, which should have been accommodated through preventative QC action, had to be accomplished through remedial efforts in many cases.
3. JFWAT's location "between" and, therefore, apart from APO and SPCO significantly strengthened its bargaining position and effectiveness.
4. JFWAT's lack of greater in-house engineering expertise and its members' minimal construction experience weakened its credibility with APO and SPCO and, thereby, compromised its effectiveness. It also placed a burden upon AOFRs to bring technical realism to JFWAT advices.
5. The orientation given APO and JFWAT field staffs was grossly inadequate to prepare them for field assignments.
6. JFWAT and APO management did not exercise adequate controls over their field staffs to assure reasonably consistent application and enforcement of environmental stipulations, with supporting documentation. In addition, AOFRs were without clerical/administrative support and spent valuable time on routine tasks that could have been performed by a technician or administrative assistant.
7. APO personnel did not have knowledge or appreciation of the subtleties of biological processes and were unwilling to take agressive or timely action on important environmental problems, particularly chronic, diffuse, and undramatic problems. JFWAT monitors were frequently unable to convince AOFRs of the importance of some problems — not only because they were not obvious, but also because of inconsistencies in JFWAT's field efforts. This resulted in AOFRs having to make assessments of the biolgical significance of a violation if they were not confident of advisors' judgment.
8. Finally, certain government actions made dramatic contributions to the protection of environmental values. These included the establishment of performance criteria — e.g., fish and wildlife construction "windows" and culvert velocity standards; requirements for big game and fish passage; APO's decision to disallow about one-half of the material sites Alyeska originally requested; and the relocation of Pump Station Two.



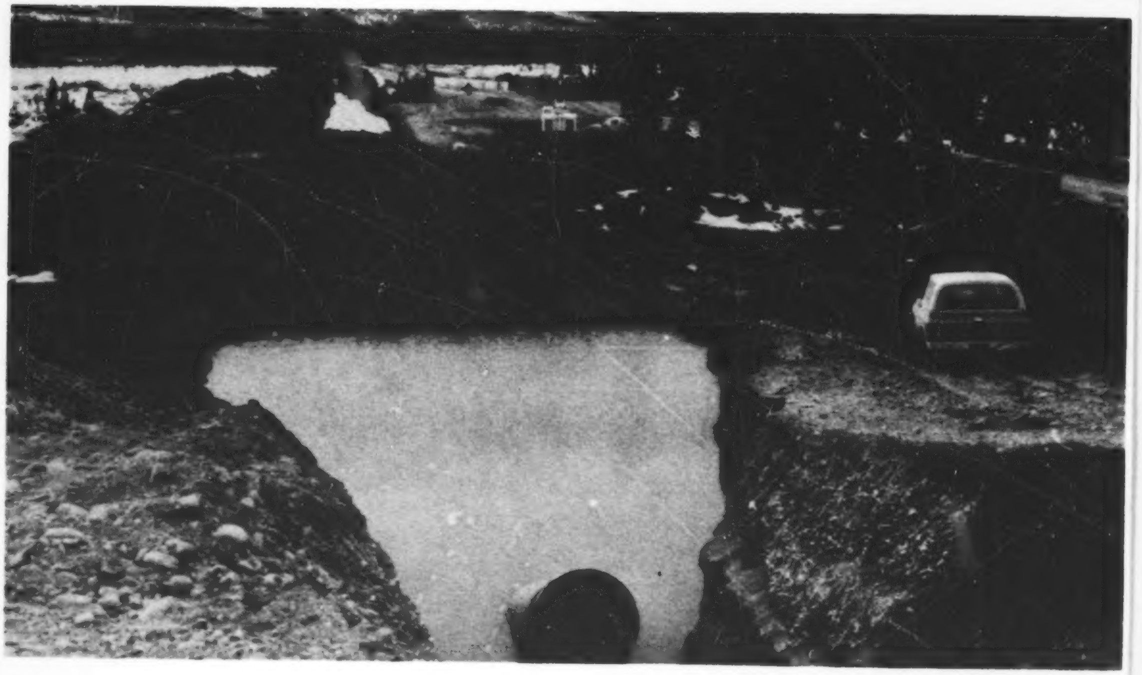
1. Elevated pipeline section under construction. Gravel work pad protects tundra and underlying permafrost from erosion—Near Arctic Ocean, August 1975. (Photos by Netsch, FWS)

2. Buried pipeline section under construction. Near Little Tonsina River Crossing, April 1975.



3. Concrete blocks are used to hold pipe in place—Tonsina River Crossing, March 1975.

4. Mining gravel from Sagavanirktok River for pipeline and haul road construction—August 1974.



5. Pipeline crossing—Little Tonsina River, April 1975.

6. Rivers in arctic Alaska were major source of gravel for pipeline construction—Atigun River in Brooks Range, July 1975.

Chapter VII — Stream Crossings and Big Game Crossings

The trans-Alaska pipeline and the 360-mile North Slope haul road cross about 1,000 streams and rivers, and roughly half of these are fish streams.[1] Because the pipeline, work pad, haul road, access roads and materials sites crossed or were near such a large number of fish streams during construction, the field staff of the Joint Fish and Wildlife Advisory Team (JFWAT) spent much of its time monitoring effects of construction on water systems along the route. The state supervisor of the advisory team has said the "most common and difficult problems"[2] the fish and wildlife monitors faced when the pipeline was being built resulted from construction crossing or passing near water. Fish and wildlife advisors cite silting of rivers and streams, improperly constructed and incorrectly used low water crossings, improperly placed or inadequately sized culverts in streams, and erosion as common problems during construction.[3]

The 800-mile pipeline system also crosses habitats and migration routes of dozens of species of large and small wildlife. Before the start of construction, Alyeska agreed to build several hundred buried and elevated crossings in areas of above-ground line to allow big game animals to move across the pipe. Records of the Alaska Pipeline Office (APO) and the Joint Fish and Wildlife Advisory Team show that 34 percent of these big game crossings were not built according to government standards in 1975, and 21 percent built in 1976 did not meet requirements of the monitoring agencies.[4]

The first part of this chapter looks at how the government field surveillance systems worked when problems developed at river and stream crossings during construction. Histories of five stream and river crossings in construction sections 4 and 5 north of the Yukon River, compiled from the records of the Alaska Pipeline Office, the Joint Fish and Wildlife Advisory Team and the State Pipeline Coordinator's Office, are included. Office and field staffs of JFWAT and APO were interviewed for more information about the stream crossings we selected and stream crossings along the pipeline in general. Because this report focuses primarily on fish and wildlife protection policies of federal agencies, these stream crossings discussed (with one exception) occurred on federal land monitored by APO. One history deals with a crossing at the state-owned haul road; surveillance on the haul road during construction was the responsibility of state monitors, but federal monitors would become involved when situations at the haul road affected resources off the road right-of-way.

Specific crossings were selected on the basis of interviews with JFWAT and APO field personnel. JFWAT monitors felt the histories of these crossings would illustrate a wide range of points: field problems created by lack of information about streams north of the Yukon River; complexity and diversity of streams along the route; kinds of problems that could occur when the pipeline system crossed complex water systems; difficulty of resolving some problems at stream crossings; how individual AOFRs dealt with stream crossing problems.[5]

The second part of the chapter discusses how government monitoring agencies reacted when more than one-quarter of about 550 big game crossings along the pipeline route were not built according to government requirements. We studied records of the Alaska Pipeline Office, the State Pipeline Coordinator's Office and the Joint Fish and Wildlife Advisory Team. We also interviewed staffs of APO and JFWAT.

This chapter examines some fish and wildlife-related problems that occurred during pipeline construction. It is not meant to imply that the kinds of problems that occurred at selected stream crossings happened at every stream crossing, or that the crossings were in any way "typical" of crossings along the 800-mile route. It is not meant to assess the severity or extent of kinds of problems documented. And finally, it is not intended to illustrate how well fish and wildlife resources were protected during construction. AOFRs emphasize that the trans-Alaska pipeline was built with minimum impact on the resources along the route, and they credit government monitoring with doing much to keep environmental damage at a low level. JFWAT monitors agree that government monitors played a significant role in lessening impact of the pipeline. As one monitor summarizes, "Some people have said JFWAT is calling the pipeline project an environmental 'disaster.' We don't think it was a disaster; we think government monitoring made a real difference . . . .We only say that more could have been done . . ."[6]

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[1] Julius Rockwell, Jr. and Richard L. Johnson, *List of Streams and Other Water Bodies along the Trans-Alaska Oil Pipeline Route*, (draft, fourth revision, 1977). This figure is an estimate.

[2] Allan Carson, JFWAT meeting with President's Council on Environmental Quality, May 12, 1977.

[3] Interviews with six JFWAT field monitors, August and September 1977.

[4] Memorandum to the files from James Hemming, APO/JFWAT, Subject: "Status, Big Game Crossing," December 21, 1976.

[5] AOFRs interviewed who had worked in construction sections 4 and 5 did not object to the use of any of these stream histories.

This chapter is intended to say: Here are some important fish and wildlife-related problems that did occur during construction, and this is how the government monitoring agencies handled them.

Field Monitors

When work on the trans-Alaska pipeline system started in 1974, the federal Alaska Pipeline Office (APO) and the State Pipeline Coordinator's Office (SPCO) assigned field staffs to oversee daily construction of the 800-mile system. The authorized officer's field representatives (AOFRs) were responsible for enforcing technical and environmental stipulations of the federal right-of-way agreement, but, as noted in earlier chapters, their duties also included assuring that the pipeline was built "promptly" and weighing "environmental amenities and values with economic practicalities so as to be consistent with applicable national policies."[7] The state field surveillance officers had similar responsibilities on state lands the pipeline crossed.

These field chiefs and their fish and wildlife advisors who went to the field at the start of construction were given copies of the state and federal right-of-way agreements and told to base field decisions on the provisions of these documents.[8] A series of "fish and wildlife stipulations" within the environmental stipulations in both agreements required that the pipeline builders provide freedom of movement for and protection of fish and wildlife across the pipeline system. Some environmental stipulations called for the pipeline builders to "avoid or minimize" effects of construction on resources along the route, and government field monitors were often required to judge whether the pipeline builders were holding construction effects to a minimum under varying field conditions.[9]

Deviations from many of these stipulations could be approved by the authorized officer or the state pipeline coordinator, if the chief government monitors felt field conditions justified such deviations. These variations were to be approved in writing by the heads of the government monitoring organizations.

In addition to broad stipulations for protection of fish and fish habitat when the pipeline system crossed or passed near streams, the pipeline builders agreed to the specific government requirement that speed of water flowing through culverts in fish streams would not exceed four feet per second during calculated five-year flood levels on given streams. This four-feet-per-second criterion was established in early 1975 and based on studies of fish swimming capabilities funded by the U.S. Fish and Wildlife Service.[10] To meet the stipulation requiring "uninterrupted and safe passage of fish," Alyeska proposed to build low water crossings[11] whenever possible rather than installing culverts when laying the gravel work pad across streams. The Joint Fish and Wildlife Advisory Team (JFWAT) and the Alaska Pipeline Office approved this plan because biologists felt low water crossings would offer fewer blocks to fish passage and require less maintenance than culverts.[12]

The JFWAT fisheries engineer worked with Alyeska engineers to design low water crossings along the route. These low water crossings were designed for use by light traffic rather than large construction equipment, and many failed during construction. The state supervisor of the fish and wildlife advisory team has attributed these failures to improper construction of the crossings and use of the crossings by heavy construction equipment; the acting authorized officer has called the low water crossing failures one of the clearest examples of the inadequacies of Alyeska's quality control program during construction.[13]

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[6] Interviews with six AOFRs and six JFWAT monitors, Anchorage, August and September 1977.

[7] *Trans-Alaska Pipeline Authorization Act*, Title II of Public Law 93-153, November 16, 1973, section 203(a).

[8] Interviews with six AOFRs, one FSO and six JFWAT monitors, Anchorage, August and September 1977

[9] A list of stipulations applied for protection of fish and wildlife and their habitats during construction appears in Appendix A.

[10] Interview, telephone, with Norval Netsch, FWS, Anchorage, October 12, 1977.

[11] Low-water crossing: a reinforced ford.

[12] Allan Carson, "An Analysis of Environmental Stipulation Compliance on the Trans-Alaska Oil Pipeline," September 10, 1975, p. 8.

Government field monitors hired early in construction received little instruction on interpreting and applying the environmental provisions and stipulations of the right-of-way agreements.[14]

As one authorized officer's field representative (AOFR) explains, "Nobody knew enough to give us those kinds of instructions" on interpreting and applying stipulations that represented a new level of government environmental monitoring. A monitor for the Joint Fish and Wildlife Advisory Team recalls that when he was assigned to a construction section of the pipeline, "My boss pointed to a map and said, 'You have this much of Alaska to minimize impact on.'" Therefore, federal and state monitors responsible for overseeing daily construction used their own judgements based on experience in deciding what constituted a "minimum" effect on fish and wildlife, what effects could be avoided, and what measures the pipeline builders should be required to take to protect resources along the route.

The AOFRs and JFWAT field monitors attended regular meetings with their supervisors in Anchorage to discuss questions of interpretation and applications of stipulations and to establish uniform policies, but AOFRs and fish and wildlife monitors maintain that individual judgements played significant roles in monitoring throughout construction.[15] The following histories of stream crossings illustrate some of the kinds of problems that occurred when the pipeline crossed streams, and how AOFRs and their fish and wildlife advisors handled these problems.

Stream Crossings

Histories

The following histories are summarized from detailed field records of APO and JFWAT.[16]

Marion Creek Haul Road Crossing: The North Slope gravel haul road crosses this large stream about 125 miles north of the Yukon river and six miles north of Alyeska's Coldfoot construction camp. Described by a JFWAT fisheries biologist as "really more a river than a stream," Marion Creek averages 60 to 100 feet wide and flows west to the Middle Fork Koyukuk River. This stream flows roughly from May to October; it is dry in winter. Grayling, Dolly Varden and slimy sculpin have been found in Marion Creek. The creek is located in construction section 4 of the pipeline system.

The 360-mile haul road is owned by the State of Alaska; the state contracted with Alyeska to build the road. During construction, the state was responsible for monitoring Alyeska's work on the haul road right-of-way. As the result of an agreement between the Governor of Alaska, the State Pipeline Coordinator's Office and the Alaska Department of Highways, engineers from the Department of Highways monitored work on the haul road. JFWAT monitors directed their advisory memos to these Department of Highways engineers. The federal Alaska Pipeline Office became involved with haul road monitoring when a situation at the haul road affected resources off the haul road.

Large culverts were installed at this haul road crossing when the road was built in 1974. In 1975 JFWAT monitors began recommending removal of the culverts and installation of a bridge at the crossing, maintaining that velocity of water through the culverts often prevented fish from moving upstream of the culverts. Department of Highways personnel, who were responsible for government surveillance on the haul road, also recommended installation of a bridge. AOFRs in the area took an interest in the question because a fish block at Marion Creek would affect resources off the haul road. In April 1977, a bridge was installed after SPCO, the Department of Highways and the Alaska Department of Fish and

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[13] Ibid., p. 9; interviews with Jack Fisher, JFWAT/NMFS, Anchorage, August 9, 1977 and Morris J. Turner, APO acting authorized officer, Anchorage, August 5, 1977.

[14] Generalization based on interviews with six AOFRs, one FSO and six JFWAT monitors, Anchorage, August and September 1977.

[15] Ibid.

[16] Information on Marion Creek haul road crossing was also drawn from office files of SPCO. Records used to compile histories include: AOFR daily field logs, AOFR field memos, JFWAT advisory memos, JFWAT narrative surveillance reports, and office "Stream Crossing" files of APO, JFWAT and SPCO. Detailed chronologies, containing all references from APO and JFWAT records, of the Chapman and Sheep Creeks crossings appear in Appendix C as illustrations of the kinds of field records used in preparing the following histories.

Game directed Alyeska to do the work. The following is a chronology of government monitoring actions at Marion Creek:

When the haul road was built in 1974, Alyeska installed three 7-foot culverts as drainage structures. In June of 1975, a JFWAT field monitor noted in an advisory memo that "Marion Creek was a barrier to migrating fish for at least six days" in late May and early June, and an AOFR noted in his log at the time that fish had been seen below the Marion Creek culverts but not above them. At about this time, a hydrologist with the Alaska Department of Highways recommended to Alyeska that a bridge be installed at Marion Creek.

Following reports of fish blocks at Marion Creek, the APO authorized officer's representative told his field staff to "investigate to take action at Marion Creek." In mid-June, a JFWAT fisheries engineer, employees of Alyeska and a hydrologist from the Department of Highways agreed that a by-pass should be constructed at the site to help move fish above the culverts. The JFWAT fisheries engineer saw this fish by-pass as "a temporary, emergency-type structure" justified by "the urgency of keeping the haul road open" during the 1975 season when many trucks carrying supplies for pipeline construction were crossing Marion Creek daily.

In early August, a JFWAT monitor reported that during low flows water was moving through the Marion Creek culverts at speeds greater than four feet per second. The fish by-pass washed out following heavy rains in late August, and the fish and wildlife advisors recommended installation of a bridge.

In late 1975, the Alaska Department of Highways again recommended that Alyeska install a bridge at Marion Creek. Early in 1976, Alyeska proposed a plan for building a reinforced fish by-pass to solve fish passage problems at Marion Creek. The JFWAT field monitors disapproved of this plan, and an AOFR issued a field memo to Alyeska, directing the pipeline builders to submit "a definite plan of scheduled activity for the physical resolution" of fish passage problems at Marion Creek no later than March 1976. This field memo recommended installation of a bridge.

In June 1976, the JFWAT fisheries engineer noted that the fish by-pass at Marion Creek had been reinforced under a plan not approved by JFWAT, and that speed of flows through the culverts was blocking small grayling. He observed that "the urgency" of keeping the haul road open "has long since passed and adequate time has gone by for the construction of a bridge."

The following month, JFWAT monitors reported water was flowing through Marion Creek culverts at six feet per second. The same month, the state pipeline coordinator wrote to Alyeska's manager of engineering, ". . . it is imperative that a bridge be constructed at this site without further delay" and that "despite all advice and directives to the contrary," Alyeska had prepared a plan showing "a rip-rapped"[17] version of the by-pass as the permanent structure.

In August 1976, an AOFR assessed the situation at Marion Creek: "JFWAT had suggested/approved a by-pass. Now do not think fish are smart enough to take by-pass. Bridge not answer because stream also flows faster than four feet per second. . . " But that same month, the Alaska Pipeline Office recommended construction of a bridge at Marion Creek.

In the fall of 1976, representatives of the State Pipeline Coordinator's Office, the Alaska Department of Fish and Game and the Alaska Department of Highways met and agreed to require Alyeska to build a bridge at Marion Creek by May 1977. In April 1977, Alyeska removed the culverts at Marion Creek and installed a 100-foot, one-lane bridge.

Chapman Creek Work Pad Crossing: During construction of the pipeline system, the work pad crossed this small stream about five miles north of where the pipeline crosses the South Fork Koyukuk River. Averaging five to twenty feet wide, this low-gradient stream is part of the Koyukuk River system and flows from about May to October; it is subject to aufeising[18] in winter. Sculpins, grayling and northern pike have been found in Chapman Creek. It is located in construction section 4 of the pipeline system.

Problems reported at this stream crossing concerned temporary work pad drainage structures. A temporary culvert was installed in early 1975, and was removed in the summer of 1976, after JFWAT monitors reported it was inadequate for high summer flows and winter aufeising. A bridge was then installed, and removed late that year when Chapman Creek was closed to work pad traffic. The following spring JFWAT monitors reported vehicles were crossing the creek at the block point. The following is a chronology of government monitoring actions at Chapman Creek:

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[17] Rip-rap: rock or other material used to protect stream banks.

[18] Aufeis: "a sheet of ice on a river flood plain, formed in winter when shoals in the river freeze solid or are otherwise dammed so that water spreads over the flood plain and freezes." U.S. Geological Survey, *Dictionary of Alaska Place Names* (Washington: U.S. Government Printing Office, 1967). Aufeis forms in successive layers and can be several feet thick.

In February 1975, a JFWAT field monitor wrote a nonconformance advisory memo noting that a culvert for the work pad crossing had been installed in Chapman Creek without an Alaska Statute 16 permit, and asked for replacement of the culvert with an approved structure within 30 days. The next month, JFWAT approved a plan calling for installation of temporary culverts to be removed from the stream before critical fish periods. An AOFR then issued a field memo authorizing Alyeska to install a temporary 24-inch culvert at the work pad crossing.

That fall, a JFWAT monitor noted that the temporary culvert was "insufficient to meet discharge during recent rains" and asked for installation of a larger culvert. The following February, JFWAT asked that a larger culvert be installed at Chapman Creek work pad crossing before breakup.

In May 1976, a JFWAT field monitor wrote a nonconformance advisory memo noting that the culvert at Chapman Creek work pad crossing was frozen shut and spring flow was eroding the work pad. The memo asked that the culvert be removed and replaced with larger drainage structures before pipeline construction equipment began crossing the stream. The AOFR receiving this memo noted that he had "told Alyeska to open this up and make a work crossing."

In June 1976, a bridge was installed at Chapman Creek, and a JFWAT monitor noted that the natural channel was to be restored that summer. In August 1976, a JFWAT monitor wrote a nonconformance field memo noting that channel restoration work at Chapman Creek work pad crossing should be completed "before freezing conditions are encountered this fall. Glaciering, vegetative changes and fish passage problems are anticipated if this work is not completed now." In a field memo written the same month, an AOFR "authorized and requested" Alyeska to remove the bridge at Chapman Creek and restore the original stream channel "after the hydrotest and insulation activities" on the pipeline itself.

In October 1976, a JFWAT monitor reported that Alyeska had removed the bridge and cleared work pad materials from the stream channel and designated the stream a "block point," with no access across the stream at the work pad.

The following spring, a JFWAT monitor noted that vehicles had been driving across the block point at Chapman Creek. The AOFR receiving this memo replied that "No environmental damage is noted. Permittee will be directed to place barricades prior to spring runoff." In May 1977, Alyeska built berms to block traffic at Chapman Creek work pad crossing.

The same month, JFWAT monitors noted that "work pad material from previous year's washouts at the pipeline station is present and areas unrestored." In October 1977, JFWAT reported no unresolved nonconformances at Chapman Creek.

Kanuti River Pipeline Crossing: The Kanuti River was the first major river crossed by pipelaying crews north of the Yukon River. It is located in construction section 4 of the pipeline system.

This major buried river crossing was preceded by a crossing plan that was reviewed by all elements of the federal monitoring field staff. The pipe was buried in a relatively short time during the winter. The following is a chronology of government monitoring actions concerning the Kanuti River crossing:

In August 1974, a JFWAT field monitor noted in a narrative surveillance report that the dates Alyeska had proposed for laying pipe under the Kanuti and several other rivers north of the Yukon were "not acceptable. They conflict with spawning or incubation periods." In September 1975, the Joint Fish and Wildlife Advisory Team identified times when work could be done in the Kanuti and other rivers with least damage to fish and habitat. The period for the Kanuti was set from September 1 through April 30.

In October of that year, an AOFR noted in his daily log that Alyeskahad devised a plan to "start clearing and pre-river crossing ditching so as to utilize cold weather to stabilize ditch banks and minimize extremely wide ditch excavations and resultant environmental damage," and that the Alaska Pipeline Office felt this was a good plan.

In late October, a JFWAT monitor issued an Alaska Statute 16 permit outlining requirements for river crossings in construction section 4. The AOFR then issued a field memo authorizing "initial preparation" for the Kanuti crossing, and referred to the JFWAT advisory memo.

In January, an AOFR asked Alyeska for a detailed plan of the Kanuti crossing, and JFWAT monitors reviewed the plan. In the same month, an AOFR directed a field memo to Alyeska, informing the pipeline builders ". . . it is imperative that equipment and manpower be mobilized expeditiously to complete the river crossings within the time frames noted . . ."

In February, an AOFR recorded in his daily log that several JFWAT monitors were "disgusted with failure of plans to spell out exactly what would be done . . . .Discussions with Alyeska engineers developed that the plans were in fact ambiguous, in that they did not want to completely negate the experience and expertise of the professional pipeline builders by locking them into definite activities at this time. The preconstruction conference, 48 hours prior to actual work, is a more proper time/place to face the 'real world' and agree together on how to minimize environmental impact, protect the fish resources and install the line within the windows if possible."

In mid-February, a JFWAT monitor issued an Alaska Statute 16 permit for blasting in the Kanuti River during February and March, and Alyeska began excavating a trench for the pipe. There were frequent references in the daily log of the AOFR during this time to progress at the Kanuti River Crossing.

(While construction crews were lowering the pipe into the trench, an equipment failure caused the pipe to drop into the trench. The AOFR directed the pipeline builders to inspect the pipe and certify that it was undamaged before burying it. At this same time, the AOFR noted that the execution contractor had used "the wrong drawing to excavate the Kanuti River crossing;" completion of the crossing was held up while the Alaska Pipeline Office reviewed a design change request for the crossing.)

In early March, a JFWAT monitor reported that the crossing was complete except "large chunks of frozen silts which have been blasted from the pipe ditch were being included" in rip-rapping on the stream banks. The AOFR receiving this memo noted that "permittee strongly notified" and that the chunks of silt had been removed from the rip-rapping. The same month a JFWAT monitor noted in a narrative surveillance report that the "first stage stream restoration is complete on the Kanuti . . .and the work is well done."

In June, a JFWAT monitor reported that rip-rap at the Kanuti River had sloughed into the river and recommended repair of the rip-rap that summer.

Sheep Creek Work Pad Crossing: The work pad crosses this small stream about 37 miles west of Chandalar Lake in the Brooks Range. Described by biologists as a "moderately high gradient stream," Sheep Creek flows into the Middle Fork Koyukuk River and averages between 4 and 10 feet wide. Grayling have been seen in this stream that flows from about May to October. It is located in construction section 5 of the pipeline system.

In early 1975, an AOFR devised a plan to improve fish passage and habitat between the haul road and work pad crossings of this high-gradient stream. Over the next two years, the pipeline builders made several attempts to implement various forms of this improvement plan. A meandered channel acceptable to JFWAT was made in the fall of 1976, but in the fall of 1977 JFWAT reported that the low water crossing at the work pad crossing of Sheep Creek was blocking fish movement. The following is a chronology of government monitoring actions at Sheep Creek:

When work crews laying the pipeline work pad approached this stream in May 1975, Alyeska proposed to install two 48-inch culverts with a letdown structure[19] at the work pad crossing. This plan was approved by the fish and wildlife advisors and the AOFR in construction section 5. Then in June, the same AOFR wrote in his daily log, "I am convinced that minimal effort would reestablish several miles of excellent fish stream habitat," and he rescinded his approval of the earlier plan. He recommended a new plan that called for decreasing the gradient of this naturally high gradient stream by constructing short segments of meandered channel between the haul road and work pad culverts. (The AOFR proposed this work to "mitigate damage to the stream previously caused by the winter trail.") The fish and wildlife monitors agreed with this plan.

That summer, a JFWAT monitor wrote a nonconformance advisory memo noting that the culverts at the work pad crossing of Sheep Creek were perched,[20] and that the meandered channel had not been excavated between the work pad and haul road. In the fall of 1975, another JFWAT nonconformance advisory memo said "despite continuous requests for plans and rehab from Alyeska, existing fish blocks . . .have not been addressed at Sheep Creek." That October Alyeska submitted a plan for rehabilitation of Sheep Creek; the pipeline builders suggested leaving in the existing culverts at the work pad crossing and taking measures to alleviate the perch at the culverts. The AOFR and JFWAT field monitor felt removing the culverts and installing a low water crossing at the work pad would be "more suitable for fish passage and less costly in the long run." A few weeks later, Alyeska changed plans and said they would remove the culverts and install a low water crossing. The fish and wildlife monitors recommended this work be done before freezeup that fall.

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[19] Letdown structure: a device for moderating a drop in elevation between a drainage structure outfall and the stream level.

[20] Perched culvert: a culvert with its outlet end above the natural stream bottom.

An AOFR later wrote in an Alaska Pipeline Office record that "because of delays and more pressing concerns, Alyeska requested and was granted by the AOFR relief on doing this item... until spring 1976. No environmental damage could be cited, thus schedule was not critical." The following spring the same AOFR issued a field memo to Alyeska, noting "Sheep Creek has been an issue since June 1975 when the existing drainage structures were installed. In agreements between AOFR/JFWAT and Alyeska, this crossing is to be modified before breakup... the commitment to complete this prior to freezeup previously made by Alyeska was delayed by AOFR at Alyeska request and to the dismay of JFWAT representatives. The commitment then made by Alyeska to AOFR is considered binding..."

In late March, Alyeska installed a low water crossing at the work pad crossing of Sheep Creek and blasted a new channel between the haul road and the work pad. In several memos in April and May, the AOFR and JFWAT monitors noted that more work was needed at Sheep Creek. In May 1976, the low water crossing at the work pad washed out during a high flow. In July, an AOFR issued a nonconformance field memo to Alyeska because "verbal requests have been made to redesign and reconstruct the Sheep Creek low water crossing... for the past month and to date no effort has been made to do so.... Please take the appropriate action to insure that the above is accomplished ASAP."

Later, the AOFR noted that the low water crossing had been repaired to the satisfaction of a JFWAT monitor. By July 1976, the AOFR who had felt fish passage and habitat could be improved between the work pad and haul road crossings of Sheep Creek wrote "the best solution would be to establish natural grade" and suggested that traffic be routed around the work pad crossing when construction of the pipeline was complete. He added, "I see no chance of establishing any important fishery up this stream and am inclined to question going on with rehabilitation . . ."

In the fall of 1976, JFWAT monitors wrote several memos asking for additional work at the low water crossing and the new channel. In November, a JFWAT monitor noted that "a slightly meandered, rip-rap lined channel with energy dissipators has been constructed at Sheep Creek. The effectiveness of this solution will be evaluated after breakup."

In May 1977, JFWAT and EEI monitors noted that the low water crossing at the work pad crossing of Sheep Creek needed to be rebuilt with a V-bottom to allow fish to move through the crossing at low flows. By mid-October, on a list of unresolved fish and wildlife problems along the pipeline and haul road prepared by JFWAT for the Alaska Pipeline Office, JFWAT monitors reported the low water crossing at Sheep Creek did not meet fish passage criteria and required a V-notched bottom.

Union Creek Work Pad Crossing: The pipeline work pad crosses this small stream about five miles north of Wiseman. Averaging several feet wide, the stream drains a marshy area and flows into the Middle Fork Koyukuk River. Grayling and round whitefish have been found in this stream described by biologists as being "good fish habitat." It is located in construction section 5 of the pipeline system.

Due to alignment restrictions, the pipeline work pad was laid over more than 1,000 feet of this small stream in September 1975. The pipeline builders were required to construct a new channel which crossed the work pad; low water crossings were built at these crossing points. In the fall of 1976, improvements JFWAT had requested earlier were done at the newly-constructed channel. In October 1977, JFWAT reported one of the low water crossings at the work pad required rebuilding. the following is a chronology of government monitoring actions at Union Creek:

In September 1975, a JFWAT monitor noted that staking for the work pad in the area of Union Creek indicated the pad would be laid on top of the stream for about 1,000 feet. The monitor asked for a hold on construction until representatives of Alyeska and the AOFR and JFWAT monitors could discuss alternatives to routing the pad over the stream; the AOFR requested a meeting with Alyeska. Following this meeting, the JFWAT monitor wrote that "mining claims east and west have apparently fixed the alignment" and that a "tentative plan for conditional rerouting of the drainage" would be reviewed by the fish and wildlife advisory team. That same month, a JFWAT advisor approved the plan for ditching a new channel, but noted that the plan did not "compensate for loss of some 1600 feet of grayling habitat which will be destroyed by pad overlay." In a field memo authorizing Alyeska to lay the pad over a portion of the stream, an AOFR noted Alyeska might later be required to take "mitigative" measures to compensate for loss of habitat. That fall, a JFWAT monitor noted that Alyeska had done "partial reconstruction" of a new channel at Union Creek. Two low water crossings were built at points where the stream now crossed the work pad.

In the spring of 1976, JFWAT monitors asked for additional work to remove a perched area in the channel dug the previous fall. In July, another JFWAT advisory memo requested the same work; this was followed by a JFWAt nonconformance advisory memo requesting the same work in August.

In the fall of 1976, JFWAT monitors reported the new stream channel had been meandered and deepened. The following spring, a JFWAT monitor reported the low water crossing at one of the work pad crossings of Union Creek was too high, and in May an AOFR issued a field memo to Alyeska, directing them to lower the crossing. In mid-October 1977, JFWAT monitors reported this crossing still required rebuilding.

Stream Crossing Observations

From the specific stream crossings researched we observed:

1. Most of the problems reported by JFWAT occurred when the work pad or haul road crossed streams, rather than when the pipe itself was installed across streams or rivers.

2. Problems with culverts and low water crossings that JFWAT reported did not meet fish passage requirements on streams were sometimes not corrected for as long as two years.

3. JFWAT monitors and AOFRs often disagreed about the severity and urgency of problems at smaller stream crossings, and about what corrective actions Alyeska should be required to take and when.

4. Individual AOFRs responded very differently to problems noted by JFWAT. One AOFR worked with JFWAT monitors to resolve reported problems; one AOFR sometimes did not seem to be aware of what remedial work had been done at stream crossings.

5. Alyeska sometimes did not do remedial work within time set by JFWAT monitors or AOFRs.

6. Low water crossings sometimes had to be rebuilt several times at the same location.

7. Work approved by one JFWAT monitor was sometimes later reported incomplete by another JFWAT monitor.

Stream Crossing Problems

AOFRs and JFWAT monitors interviewed were asked why so many problems occurred when the pipeline system crossed small streams and why the problems took so long to solve.

Federal and state biologists believe many of the common problems at stream crossings — with inadequate drainage structures, for example — originally occurred because so little was known about a number of the streams, particularly those north of the Yukon River. As one fisheries biologist who has studied streams along the corridor since 1970 explains, "When we're talking about Alaskan streams, we're talking about an entirely different thing than streams in the Lower 48; coming here and dealing with these streams is like landing on the moon and looking at streams . . . ."

When Alyeska submitted, and APO (with JFWAT review) approved plans for drainage structures at streams, the structures were based on what limited knowledge there was about individual characteristics of hundreds of streams along the route. More information about these streams was gathered during construction.

But JFWAT monitors and AOFRs cite many reasons why problems at some small stream crossings persisted throughout much of construction. The following are reasons for the delays most often cited by fish and wildlife monitors. After that is a listing of reasons most often cited by AOFRs.[21]

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[21] The following summaries of opinions of AOFRs and JFWAT monitors are based on interviews with six AOFRs and six JFWAT monitors, Anchorage, August and September 1977.

JFWAT: JFWAT monitors attribute continuing problems at small stream crossings throughout construction to the following reasons:

1. *Many AOFRs gave priority to pipeline construction and were unwilling to press Alyeska to correct fish passage problems within the time JFWAT asked.* JFWAT monitors report that each year the fish and wildlife advisors would prepare lists of items — drainage structures blocking fish passage, for example — that they recommended be completed before breakup. The Alaska Pipeline Office would pass these to Alyeska, but the pipeline builders often did not complete the work by the designated date. Fish and wildlife advisors note that several AOFRs made frequent reference to the fact that "Congress had mandated" that the pipeline be built "expeditiously" and would ask the JFWAT advisors to show that "irreparable damage" to fish or habitat would occur if the work was not done by the designated time. Says a JFWAT monitor, "We were always on the defensive, always being asked to 'prove' what damage would occur if certain work wasn't done in a timely manner." Another JFWAT monitor reports, "One AOFR told me he felt the pipeline should be built first, and drainage structures corrected later." Explains another member of the fish and wildlife advisory team, "Fish passage problems were elephantine to us .but they were ants to most of the other government monitors."

2. *Size of a stream and kinds of fish in the stream influenced how quickly many AOFRs would ask the pipeline builders to correct a fish passage block at a drainage structure.* Several JFWAT monitors note that most AOFRs reacted more quickly to solve fish passage problems in a stream that was known to be a salmon spawning stream, than, for example, a stream known to contain only slimy sculpin.

JFWAT monitors also believe many AOFRs did not recognize the importance of very small fish streams as habitat. Explains a JFWAT monitor, "We had trouble convincing AOFRs that a stream maybe 18 inches wide and a few feet deep is excellent fish habitat" and that the "better fish habitat" along the pipeline route is in the small streams rather than the large rivers. Another JFWAT monitor notes an AOFR had expressed doubt that a stream that is dry during certain times of the year could be an important fish stream.

3. *Obvious fish blocks usually got quick attention from AOFRs; more subtle effects of construction often did not.* Several JFWAT monitors report that most AOFRs they had worked with would direct Alyeska to take some action "if they could actually see fish behind a culvert," whereas they would not press Alyeska "to remove work pad material that had eroded into a stream channel and altered the natural stream bottom."

4. *Pipeline builders sometimes had to return to the same stream several times to correct drainage structure inadequacies.* JFWAT monitors feel this situation occurred at some streams because: JFWAT/APO and Alyeska originally had inadequate knowledge about what kinds of drainage structures would be needed on some streams; Alyeska's quality control program failed to insure that culverts or low water crossings were installed according to approved designs; and some AOFRs did not require Alyeska to correct drainage structures "in a timely manner" when it became apparent they were not installed according to approved designs.

AOFRs: AOFRs attribute problems that persisted at some small streams throughout much of construction to these reasons:

1. *If there was not "worsening environmental degradation" or "irreparable harm" occurring because of a problem JFWAT documented at a small stream crossing, work on that crossing could be deferred if Alyeska said work crews were needed for critical pipeline work.* As one AOFR explains, "Every year we would give Alyeska a list of items JFWAT recommended be completed before breakup, and Alyeska would say they would do it.Then they wouldn't do some of the items by breakup, and we would tell Alyeska to do the items before fall freezeup. Alyeska would say they would do them. Then they wouldn't . . .Why did we let them do this? Because we felt there was no worsening of environmental degradation, the pipeline had to be built, and we knew they would be required to do the work when construction slowed down."

Several AOFRs note it was their responsibility "to balance environmental amenities and values with economic practicalities" in deciding when Alyeska should be directed to do work at small stream crossings. One AOFR says, "I had to decide, is it warranted to ask

Alyeska to bring a crew back from other work to replace this culvert now, or if the situation is not worsening, to let them wait until later?" AOFRs note that they and JFWAT monitors frequently disagreed about whether "irreparable harm" to fish and habitat was occurring because of these delays, but that as chiefs of the government monitoring staff, the responsibility for making decisions about what Alyeska would be required to do and when rested with the AOFRs.

2. *JFWAT monitors sometimes asked for replacement of drainage structures based on insufficient evidence that the structure did not meet government requirements.* One AOFR notes that some JFWAT monitors "would measure speed of flow through a culvert following a heavy rain in an area of the pipeline where heavy rains happen only a couple of times a year, and the high flows last one or two days. If you measure the speed of flow at that time, can you really say the culvert is too small, that it's blocking fish?" Another government engineer believes that the JFWAT monitors would "take measurements of stream flows during flash floods" and then press their "technical but not practical" claims of inadequate culvert size.

Several AOFRs also report that they were reluctant to direct Alyeska to replace a structure that had been previously approved by APO and JFWAT, unless JFWAT presented strong evidence that the approved structure did not meet government specifications. They had to decide, "Does the evidence justify asking Alyeska to spend $10,000 to replace that culvert that we had approved?" Some AOFRs also note that they were cautious about directing Alyeska to take an action that might later prove to have "unnecessarily cost the contractor time and money." The AOFRs explain that in previous construction projects, government inspectors whose actions could be proven to have unnecessarily cost a private construction contractor money or time have been held liable in courts of law for damages.[22]

3. *Some stream crossings presented problems that were not easily solved, despite directions from the AOFRs and attempts by Alyeska.* As one AOFR explains, "Many of these problems happened at streams that presented tough situations . . . the arctic is a place with unique engineering problems."

At the end of this chapter—following a discussion of problems with big game crossings along the pipeline route—we will draw a series of our own conclusions concerning APO/JFWAT monitoring of fish and wildlife-related problems reviewed here.

Big Game Crossings

One of the environmental stipulations in the state and federal right-of-way agreements requires that the pipeline builders "construct and maintain the Pipeline, both buried and aboveground sections, so as to assure free passage and movement of big game animals."[23] Before work on the pipeline system began in 1974, state and federal biologists in Alaska developed standards for construction of buried and elevated big game crossings in areas of elevated pipe. The Alaska Pipeline Office and the State Pipeline Coordinator's Office required Alyeska to meet these standards in constructing several hundred big game crossings along the 800-mile route. Records of APO and JFWAT show that 88 elevated crossings of 224 buried and elevated crossings built in 1975 did not meet government standards, and 69 elevated crossings of 326 crossings built in 1976 fell short of the standards.[24] In this part of the chapter we will look at how government biologists established standards for the crossings and how the monitoring organizations reacted when they learned a number of the constructed crossings fell short of the required standards.

Crossing Standards

One of the most emotional issues debated by national environmental groups and the oil industry, after a partially elevated trans-Alaska pipeline was proposed, was whether the elevated pipe would block movements of Alaska's big game animals, particularly caribou and moose. The Arctic, Porcupine and Nelchina caribou herds now seasonally move across about 400 miles of the pipeline corridor.[25] Moose are found along all but about the most northerly 75 miles of the pipeline route. Bison are found in the Delta area, and brown and black bears have habitat in many areas of the pipeline route.

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[22] The AOFRs who referred to this liability of government inspectors were largely referring to past projects monitored by government inspectors of the Corps of Engineers.

[23] *Agreement and Grant of Right-of-Way for Trans-Alaska Pipeline*, Exhibit D, "Stipulations for the Agreement and Grant of Right of Way for the Trans-Alaska Pipeline," stipulation 2.5.4.1.

[24] Memorandum to the files from James E. Hemming, APO/JFWAT, Subject: "Status Report, Big Game Crossing," December 21, 1976.

[25] But wildlife biologist Robert LeResche has noted that caribou ". . . migrate long distances in patterns we still cannot predict. . . . Caribou do have some constants in their generally unpredictable lives: calving areas, migration routes and a very few wintering areas. . . . This pipeline's effect on present caribou population is less important than its effect on the future potentials available for caribou." "The Future of Caribou in Alaska," *Anchorage Daily News*, December 11, 1973.

In 1971, Alyeska, the U.S. Fish and Wildlife Service and BP Alaska, Inc. sponsored two studies of caribou reactions to mock elevated pipelines at Prudhoe Bay. These studies were followed by another experiment with mock elevated pipe near Nome. Sponsored by several state and federal agencies, the Nome study tested reindeer reactions to the elevated structure. Largely on the basis of these studies,[26] biologists from state and federal agencies in Alaska took the position that "all evidence" showed "no elevated structure" would meet the stipulations calling for free movement of caribou.[27] Alyeska maintained that there could be "alternate interpretations from results of the Prudhoe Bay experiments."[28]

No formal experiments were conducted before construction to test reactions of moose to elevated pipe. But in 1925, miners in the Chatanika Valley near Fairbanks had built a partly elevated 48-inch diameter pipe to carry water for gold mining operations, and in the summer of 1971 the Alaska Department of Fish and Game began studying the effects of that pipe on moose movements. The state biologists concluded, "Pipe elevated to five and one half feet or more will probably pass moose, providing minimum bents are spaced at least 20 feet apart," but added ". . . there is reason to believe that the present trails and tracks in and around the Davidson Ditch may be largely tracks of female moose and calves; there is reason to suspect that antlered males may not cross under the pipe with only five to six feet of clearance."[29]

In a December 1972 meeting with Alyeska, the Department of Fish and Game "suggested that an eight-foot gap between the ground or snow level and the pipe would probably accommodate moose movements."[30]

There was no specific information available about how bears and bison might react to an elevated pipe, but based on their general knowledge about those animals' reactions to man-made structures, biologists assumed bears and bison would pass under the pipe.

By November 1973, state and federal biologists agreed on standards for construction of big game crossings they felt might meet the stipulation calling for "free passage and movement of big game animals." These included:

> In areas occupied or traversed by moose or bison, pipe must be elevated to a minimum of 10 feet between the top of the working pad and the bottom of the insulated pipe for linear distance of 60 feet at intervals of approximately 1,000 feet. However, such elevated sections shall be adjusted to coincide with those locations that are most often used by moving moose and bison.
>
> ……
>
> In areas traversed by caribou pipe must be buried to accommodate caribou movements.[31]

The biologists who established the standards note that they were not sure that big game would in fact use these kinds of buried and elevated crossings, and that they did not intend to free the pipeline builders from their obligation to meet the stipulation. Explains Jim Hemming, JFWAT federal coordinator and one of those who helped develop the standards, "We only said the kinds of crossings we recommended stood the best chance of meeting the stipulation, based on the knowledge we had at the time."[32] Biologists also maintain that if in the future it becomes apparent the crossings are not meeting the stipulations, then Alyeska will be obligated to try other methods.[33]

These standards were formally passed to Alyeska in March 1974, and the APO and the SPCO notified Alyeska later that the government monitoring agencies would enforce these standards. Early in 1974, biologists from state and federal agencies and Alyeska's environmental protection department designated several hundred locations in areas of elevated pipe where buried and elevated crossings would be needed. In August 1975, Alyeska issued a document listing these designated crossings;[34] originally about 445 crossings were to be built, but several remodes of below- to above-ground pipe during construction increased that number to about 550.

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[26] Findings of Prudhoe Bay studies compiled in *The Reactions of Barren-Ground Caribou to Simulated Pipeline and Pipeline Crossings Structures at Prudhoe Bay, Alaska*, prepared by Kenneth N. Child, Alaska Cooperative Wildlife Research Unit, University of Alaska, June 30, 1973. Findings of Nome study compiled in *The Reactions of Reindeer to a Pipeline Simulation at Penny River, Alaska: Interim Report*, by Kenneth N. Child and Peter C. Lent, Alaska Cooperative Wildlife Research Unit, University of Alaska, May 30, 1973.

[27] Memorandum from game biologist, Alaska Department of Fish and Game, Fairbanks, to chief of habitat, Alaska Department of Fish and Game, Juneau, Subject: "Alyeska/Fish and Wildlife Team Big Game Crossing Meeting," March 18, 1974.

[28] Minutes of Meeting between Alyeska Pipeline Service Company and State of Alaska, Subject: "Big Game Passage on the Trans Alaska Pipeline System," March 15, 1974.

[29] Letter to chief, BLM, pipeline division, from management coordinator, division of game, Alaska Department of Fish and Game, September 12, 1973.

[30] Meeting Report from BLM state director to BLM national director, Subject: "APSC Meeting on Big Game Movements, Copper River Basin," December 13, 1972.

[31] Meeting Report from APO wildlife biologist to authorized officer, Subject: "APSC Action re Big Game Movements," March 22, 1974. These criteria also called for revegetation of the work pad at big game crossings; this revegetation work began in 1977 and is not dealt with in this report.

[32] Interview with James Hemming, JFWAT federal coordinator, Anchorage, August 31, 1977.

[33] Ibid.

[34] Engineering Release 553, Alyeska Pipeline Service Company, August 1975.

Crossing Construction

In the spring of 1975, a JFWAT monitor identified the first elevated crossing where the bottom of the pipe was less than 10 feet from the top of the work pad.[35] According to APO and JFWAT records, 88 elevated crossings of 224 buried and elevated crossings built that year fell short of the required 10-foot height.[36]

In the fall of 1975, JFWAT drew up a plan outlining how the pipeline builders could correct the crossings that were constructed too low. The plan said:

> All work must be covered by design change requests, either singly or in blocks. Thus, where changes are proposed complete field and technical staff review are possible. Original wildlife crossing siting is optimum for animal use.
>
> All errors of 0.5 feet or less may be corrected by excavating the work pad.
>
> a. Errors of 0.5 feet or greater require that the split ring be reset to specification, or
>
> b. where consistent with environmental and technical stipulations the work pad may be excavated to meet the minimum . . . distance, or
>
> c. where necessary both a. and b. above.
>
> Errors that are not able to be corrected by excavation and/or resetting of the split ring may require reconstruction of the big game crossing.[37]

In December 1975, APO forwarded these remedial suggestions to Alyeska, and SPCO passed them to Alyeska in February 1976.[38] After receiving this notification from the monitoring agencies, Alyeska replied, ". . . there seems to be no factual information to substantiate the need to maintain the arbitrary 10-foot criterion in every case" and asked for "selective waiving" of the 10-toot standard.[39] Both government agencies replied that the standard would not be waived.[40]

During 1976, 69 elevated crossings of 326 elevated and buried crossings were built less than 10 feet high. Most of these substandard crossings were reported by JFWAT monitors.[41]

JFWAT attributes the incorrect construction of these big game crossings to failure of Alyeska's quality control program.[42] The Alaska Pipeline Office cites insufficient quality control and "many other field factors," including the fact that actual ground elevations were sometimes not as indicated on construction drawings.[43] In a December 1975 audit, Alyeska's quality assurance department reported designated crossings of "insufficient height" had been built due to: "ground elevations not as depicted on plans; the computer program could not correct erroneous ground elevations; [the document listing the crossings] was not transmitted to construction until late in the effort; engineering allowed some changes of pad and/or pipeline elevation that did not consider wildlife crossing criteria; some were construction oversights."[44]

In September 1976, JFWAT reported "92 crossings still required remedial work," and in December 1976, the fish and wildlife advisors noted the number needing remedial work had decreased to 30.[45] In the summer of 1977, construction crews were excavating some crossings needing remedial work.

Remedial Work

After the guidelines for remedial work on big game crossings were forwarded to Alyeska, the JFWAT federal coordinator and the team's staff wildlife biologist[46] made periodic trips to the field to meet with representatives of Alyeska's environmental protection department to determine what remedial work would be done on individual crossings. Most of the approximately 150 crossings that were built less than 10 feet high were corrected through excavation of the work pad; about 50 substitute crossings were designated.[47] In a few cases, split rings on vertical support members may have been raised before pipe was installed.[48] JFWAT reports no installed pipe was raised at any of the crossings.[49]

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[35] Narrative Surveillance Report, sections 1 and 2, Hank Hosking, JFWAT, July 1-9, 1975.

[36] Memorandum to the files from James Hemming, APO/JFWAT, Subject: "Status Report, Big Game Crossing," December 21, 1976.

[37] Letter to Alyeska's manager, project permissions, from APO, authorized officer's representative, Subject: "Corrective Action on Wildlife Crossings," December 23, 1975.

[38] Ibid.; and letter from state pipeline coordinator to president, Alyeska, February 25, 1976.

[39] Letter from Alyeska manager of environmental protection to authorized officer and state pipeline coordinator, Subject: "Moose Crossings," February 7, 1976.

[40] Letter from APO authorized officer to Alyeska manager of environmental protection, February 19, 1976; and letter from state pipeline coordinator to president, Alyeska, February 25, 1976.

[41] Interview with James Hemming, APO-JFWAT, Anchorage, August 31, 1977, and Memorandum from APO technical staff coordinator to APO authorized officer's representative, Subject: "Non-Welding Quality Control Matters," May 28, 1976.

[42] JFWAT Meeting with President's Council on Environmental Quality, Anchorage, May 12, 1977.

[43] Interview, telephone, with Morris J. Turner, APO, acting authorized officer, Anchorage, October 21, 1977.

[44] "An Audit of Wildlife and Road Crossings, Pipeline Sections 1, 2, 3, 4," Alyeska Pipeline Service Company Quality Assurance, December 1975.

[45] Memorandum from JFWAT staff wildlife biologist to JFWAT federal coordinator, Subject: "Remedial Action on B.G. Crossings," September 20, 1976; and Memorandum from JFWAT federal coordinator to files, Subject: "Status Report—Big Game Crossing," December 21, 1976.

[46] James Hemming and Keith Morehouse, the two JFWAT members who most regularly met with Alyeska representatives to resolve big game crossing questions.

[47] *List of Designated Wildlife Crossings for the Trans-Alaska Oil Pipeline*, JFWAT Special Report Number 11, August 1977.

Crossing Excavation: When JFWAT wildlife biologists and biologists from Alyeska's environmental protection department had decided which crossings would be corrected through excavation of the work pad, the question in the field became—how would the excavation be done? Should the pad be excavated only under the pipe, or excavated the required amount under the pipe, with decreasing excavation across the width of the pad, or should the required excavation be done equally across the width of the pad, including the 15-foot driving surface to be maintained during pipeline operations?

JFWAT took the position that unless geotechnical considerations precluded it, specified excavation should be done across the width of the pad, to create a "window" for animals approaching the crossing.[50] APO and SPCO supported excavation across the width of the pad wherever possible.[51]

There were disagreements in the field between JFWAT monitors and AOFRs and FSOs on methods of excavation. Some decision-making state and federal monitors felt the need to establish a 10-foot high crossing did not justify sometimes substantial excavation of the work pad. They felt this excavation might present hazards to the integrity of vertical support members and pad driving surface at the crossings and that some excavated crossings would require frequent maintenance during pipeline operation. Other AOFRs and FSOs supported the JFWAT position that the need to maintain the required 10-foot height did justify excavation that might require the pipeline builders to take protective and maintenance measures at the crossings, except at those crossings where the monitoring agencies' technical staffs advised against excavation the width of the pad. Many of these questions about method of excavation at the crossings were ultimately resolved by upper level JFWAT, APO and SPCO officials meeting with representatives of Alyeska's environmental protection department.[52]

The two JFWAT wildlife biologists who worked closely with the big game crossing problems believe that public discussion of the need for the crossings before construction began, and the publicity that appeared concerning the improperly constructed crossings in mid-1976, strengthened their requests for remedial work on the crossings, particularly in 1976.[53]

Game Crossing Observations

1. Although the government monitoring agencies and Alyeska were aware that 88 designated elevated crossings were built lower than the required 10 feet in 1975, 66 crossings were still constructed lower than the required height in 1976.

2. Alyeska quality assurance auditors and government monitoring agencies essentially agreed that construction errors at big game crossings often occurred because of lack of effective quality control.

3. Although "reconstruction of the crossing" was one of the possible remedial actions listed in the monitoring agencies' guidelines to Alyeska, installed pipe was never raised at a crossing. JFWAT members indicate this may have been because government monitoring agencies took the position that directing Alyeska to raise the pipe would have been "too expensive."[54] The acting authorized officer of the Alaska Pipeline Office believes the issue of cost in raising the pipe "had nothing to do with" the type of corrective work actually done at the crossings, but rather involved the question of how much discretion government should give industry in determining how to meet government standards.[55]

4. Remedial work on some crossings was done a year or more after it was discovered the crossings did not meet the government standards.

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[48] Height of split ring on vertical support member determines height of installed pipe. One JFWAT field monitor interviewed in Achorage, September 1977 noted that some split rings discovered to have been installed too low at big game crossings may have been raised before pipe installation.

[49] JFWAT Meeting with President's Council on Environmental Quality, Anchorage, May 12, 1977.

[50] Interviews with James Hemming and Keith Morehouse, JFWAT, Anchorage, August 1977.

[51] Memorandum to files from APO authorized officer's representative, Subject: "Project Review Meeting," December 10, 1976; letter from state pipeline coordinator to president, Alyeska, October 28, 1976.

[52] The preceding summary of field-level disagreements about work pad excavation was drawn from interviews with six AOFRs and six JFWAT field monitors in Anchorage in August and September 1977, and interviews with James Hemming and Keith Morehouse, JFWAT, Anchorage, August 1977.

[53] Interviews with James Hemming, JFWAT/APO, and Keith Morehouse, JFWAT, Anchorage, August 1977.

[54] Interviews with office and field staffs of JFWAT, Anchorage, August and September 1977.

[55] Interview, telephone, with Morris J. Turner, APO acting authorized officer, October 21, 1977.

Comparisons and Contrasts—Stream Crossings and Big Game Crossings

In researching these two aspects of fish and wildlife monitoring during construction, we have noted that there were similarities and differences in the way problems that occurred with each of these were handled by the monitoring agencies:

1. Stream and river systems crossed by the pipeline are complex, and problems that occurred at some streams during construction involved many factors; problems at individual streams required individual solutions. Many of these solutions involved judgement on the part of JFWAT monitors and AOFRs. What is the best way to solve this problem? When should it be solved? How much should we direct the pipeline builders to do? What is minimum impact? Problems at stream crossings were handled largely by field monitors day-to-day. Because JFWAT monitors frequently had little information about individual streams, their recommendations (particularly early in construction) were often based more on general biological judgement rather than detailed information on effects of construction on a stream. Some AOFRs accepted the fish and wildlife advisors' assessments, and some made their own assessments of the effects of construction on streams and decided what and when Alyeska should be required to do, based on the AOFR's assessment of the problem.

2. Government standards for construction of elevated big game crossings were simple—the crossings had to be 60 feet long and 10 feet high. Most of the crossings built incorrectly were constructed lower than the required height; they represented essentially a single set of problems that could be solved in a limited number of ways. Although JFWAT monitors, and sometimes other government monitors, field checked the crossings to see if they met government standards, corrections of the low crossings were handled largely by two JFWAT wildlife biologists and Alyeska's environmental protection department. There were differences in the way fish and wildlife advisors and other government field monitors viewed problems with big game crossings, but there was far less judgement involved in monitoring static big game crossings than in dealing with individual, ever-changing streams.

3. There were disagreements among JFWAT monitors and AOFRs about whether methods of correcting the low big game crossings were justified in light of construction and economic considerations, just as there were disagreements among the fish and wildlife advisors and other government monitors about whether proposed methods of correcting problems at stream crossings were justified in light of other considerations. JFWAT monitors saw their job primarily as protecting fish and wildlife and habitat, while other government monitors saw their job as assuring that a sound pipeline was built as quickly and economically as possible, with environmental damage held to a minimum. The questions in the field often became: who is best qualified to judge whether impact on fish and wildlife resources is being held to a realistic minimum? What is a realistic minimum? Given little instruction on interpretation and application of the stipulations, individual AOFRs and JFWAT monitors developed their own systems of monitoring based on education and past experience, and widely-varying methods of handling fish and wildlife problems resulted. Some AOFRs showed little concern for fish and wildlife problems, and some JFWAT monitors showed little concern for other pipeline-related problems AOFRs were responsible for dealing with.

4. Correction of problems at stream crossings and big game crossings was sometimes delayed from one to two years after the time the problems were first noted. AOFRs were willing to defer correction of these problems in favor of construction progress, if they judged "no worsening environmental degradation" or "irreparable damage" was occurring because of the delay and other construction work was more critical. Again, the question in the field became: What damage is actually occurring due to this situation? Since JFWAT monitors often had no detailed information about effects of construction on fish and wildlife, they relied largely on a strict interpretation of the stipulations and application of established criteria under varying circumstances. AOFRs often felt the stipulations were meant to be applied according to specific field conditions and questioned whether some stipulation violations reported by JFWAT were actually causing damage to the environment. Thus, JFWAT monitors were frequently asked to show what damage was occurring, rather than whether established criteria were being met.

Part 4 - Conclusions and Recommendations

Chapter VIII—Conclusions and Recommendations

Participants in future development-surveillance projects will bring to their work a much higher level of awareness of potential problems and strategies for dealing with them as a result of the Trans-Alaska Pipeline System (TAPS) experience. This study attempts to contribute to that awareness by identifying and assessing problems in the TAPS case. This does not necessarily imply, however, that the problems were avoidable in their own context—that is, under the specific circumstances of trans-Alaska oil pipeline planning and construction between 1969 and 1977.

In framing conclusions and recommendations, we have kept in mind a range of other projects that are likely to present environmental surveillance problems comparable to those of TAPS, if not in its full scale: the Prudhoe Bay gas pipeline, OCS exploration and development, major hydroelectric projects, and similar large-scale developments in Alaska and elsewhere.

TAPS Surveillance Accomplishments

Because this study focuses on issues and problems, a generally critical tone is inherent in the analysis. This should not obscure the fact, however, that the TAPS project represented a precedent-setting advancement in the art of integrating environmental values into a major development project. The project presented an extraordinary learning opportunity for all participants—in adapting to its size, complexity, and uniqueness; in developing new criteria, management procedures, and organizational forms; in adjusting professional and personal orientations, attitudes, and habits; and in resolving conflicts of status, roles, and positions. The pressures of construction time and scheduling did, however, impose severe limits and constraints on these opportunities. But even harder critics of pipeline surveillance, who were also participants in it, retained a positive sense of involvement:

> Despite the frenetic pace, physical strain, and a not always cheery won-lost record, a number of JFWAT biologists, myself included, came around to enjoy the challenges of the mammoth project, especially the feeling of being in the forefront of attempting something unprecedented in history. In particular, many of us have been quite acutely aware of the potential for influencing patterns and standards that might be adopted for future oil and gas pipeline construction surveillance in Alaska, Canada, and elsewhere.[1]

Substantive accomplishments of the fish and wildlife agencies show up as part of the general advancements made in incorporating environmental stipulations and criteria into the basic rules governing the design and construction of the pipeline project. Particularly significant among the fish and wildlife-related elements of these new rules were the "construction windows" that specified permissible times for construction activity affecting particular habitats, standards for big game crossings, and stream-culvert velocity criteria. Notwithstanding the slippage between standards and performance, the formal incorporation and application of these new rules represents tangible progress in the state of the art, and they undoubtedly effected improvement in design review and construction monitoring process through the effort of JFWAT and other surveillance organizations.

Despite legal and political constraints on pipeline planning before passage of the pipeline authorization act, substantial work was done on critical technical and engineering problems affecting the structural integrity of the line. The investments in resolving the permafrost, seismic, and other geotechnical problems, and advances in cathodic protection techniques, yielded benefits from the environmental protection point of view as well.

There is a positive as well as a negative side to the problem of developing adequate environmental data and analyses for pipeline design review and construction monitoring. The fish and wildlife agencies were constrained throughout the planning and construction periods by limited budgets and manpower for pipeline-related

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[1] David W. Norton, "Effects of the Trans-Alaska Oil Pipeline Construction Phase on Fish and Wildlife Management," Paper prepared for Commission Counsel, MacKenzie Valley Pipeline Inquiry, March 24, 1976, p. 16.

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studies, and coordinated efforts to undertake such studies sharply declined with the expiration of the Interagency Fish and Wildlife Team once construction began. Major deficiencies remained in the data and analytical base despite the study time afforded by the four-year delay in pipeline construction. It is nonetheless also the case that systematic data collection and analysis work was accomplished, and substantial additions were made to the data base. Further, the work that was done—including the identification of critical data gaps, establishment of study priorities, and development of strategies for filling them—will likely influence the types of study programs considered essential for such projects in the future.

Major Conclusions

Fish and wildlife protection aspects of TAPS surveillance were shaped by factors affecting surveillance policy and organization generally. The most significant factors are discussed in this section.

Priority on Construction

National energy development priorities defined by the Administration and Congress, together with the high costs of delay to industry and to federal and state governments,[2] emphasized the need to bring Prudhoe Bay oil to U.S. markets as soon as possible. Although TAPS construction was not officially mandated until passage of the Trans-Alaska Pipeline Authorization Act of 1973, there was a substantial de facto commitment to TAPS, and consequent momentum behind the project, from an early point in the planning process. Further, apart from the legal blocks, the major obstacles to construction were technological; resolving permafrost, seismic, and other geotechnical problems, in turn, was considered a key to preventing environmental damage. Thus, environmental protection was subordinated to the overriding construction goal, basic environmental problems were defined in engineering terms, and government surveillance authorities were reluctant to demand strict compliance with environmental stipulations, particularly where this might result in construction delays.

Role of Industry

Major premises of the surveillance system were that Alyeska would design the pipeline and monitor its construction. Government's role could then be limited to reviewing Alyeska's designs and spot-checking the effectiveness of its quality assurance/quality control (QA/QC) program. Alyeska's performance was unsatisfactory, however, in both design and monitoring phases. Government planners found it necessary, therefore, to become deeply involved in Alyeska's design and engineering work prior to project authorization, and government monitors had to assume first-line environmental monitoring responsibilities. The effects were to concentrate government's attention on technical-engineering elements of the project and to overextend government staff in all aspects of monitoring, but particularly in fish and wildlife and other environmental protection activities.

Multiple Agency Jurisdiction

Multiple agency involvement in TAPS planning and construction was unavoidable, given the existing statutory authorities and responsibilities of several federal and state agencies in areas of fish and wildlife management, pollution control, land management, pipeline safety and others. Inefficiencies were mitigated, however, by concentrating authority in BLM's pipeline division during the planning period and in the Alaska Pipeline Office (APO) during the construction period. But the pattern of diverse, independent bases of authority, which legally and politically could not be totally subsumed within a single lead agency structure, served positive functions in the case of the TAPS project: It forced Interior policy makers (and Alyeska) to deal with and accommodate different values, interests, and objectives represented by the various agencies, and helped moderate the dominant technical-engineering and construction concerns. Fish and wildlife agencies among others, therefore, had to be taken into account and accommodated to a greater extent than might otherwise have been the case within a more fully consolidated surveillance system.

It was a particularly significant accomplishment on the part of the fish and wildlife agencies that JFWAT was established, developed its own identity, and served effectively as a vehicle for introducing home agency authority (Alaska Statute 16 especially) and influence to bear within the broader surveillance organization.

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[2] See Appendix D below, "Analysis of the Costs of Delay in the Trans-Alaska Oil Pipeline Project," by Michael J. Scott.

Having the benefits and protective coverings of their home agencies, the JFWAT biologists were at the same time remarkably successful in shedding restrictive aspects of their separate agency affiliations and working together in a mutually supportive, close-knit group. Similarly, despite the frustrations attending their subordinate role in pipeline planning, FWS officials remained persistent in promoting their interests, which had to be taken into account if not accommodated as often as those officials would have wished, during the planning phase.

In a more restrictive hierarchical system, with more concentrated attention to more exclusively defined development goals, it is unlikely that fish and wildlife protection values and interests would have the influence that they did in this case.

Recommendations

Surveillance Organization

JFWAT was an organizational anomaly that worked. Its location "between" the federal and state surveillance decision makers reinforced rather than weakened its influence, even though its formal role was advisory. JFWAT's jurisdiction, however, was artificially circumscribed. Fish and wildlife protection is a special case of environmental protection, and we found no adequate justification for the separation. JFWAT also lacked engineering expertise and construction experience. This weakened its credibility and aggravated communication problems between the biologists and the engineers.

Recommendations for surveillance organization are:

1. Organize the fish and wildlife protection functions within a joint federal-state team advisory to both federal and state surveillance authorities, as was done in the TAPS case.
2. Expand the joint team's jurisdiction to cover all related environmental protection functions, and the team should include staff members detailed from the Environmental Protection Agency and the Alaska Department of Environmental Conservation.
3. Make civil engineering, hydrologic and other appropriate technical expertise available in-house to the environmental protection team.
4. Include design review, technical support, environmental monitoring, and technical evaluations in the joint environmental team's functions.

Training

Stipulations were interpreted in different, inconsistent, and contradictory ways by government monitors. Even when adequate information was available, different monitors assessed environmental effects differently, depending on the relative weights they placed on protecting a particular habitat, saving time and money, or simply avoiding unpleasant encounters, among other factors. The occasions of inconsistent and contradictory applications of the stipulations might be reduced in future projects. Neither biologists nor engineers were introduced to the basics of each others' professional fields as applied to project monitoring processes and problems. Nor were they given adequate training or guidance for enforcement of environmental stipulations before they went into the field.

Recommendations for monitor training are:

1. Biologists and engineers should participate in a joint training program to familiarize each group with basic problems, processes, and techniques of the others' profession as applied to environmental monitoring of construction projects (e.g., construction at stream crossings and effects of construction-related disturbances on fish streams).
2. Monitors should receive training in stipulations enforcement. This training should include explanations of rationales for stipulations, representative case applications, methods of interpretation and uses of discretionary authority, and relationships between stipulations and existing statutes.
3. Monitors should be trained in methods of data collection and analysis, including sampling and testing (e.g., water velocities, turbidity), necessary to demonstrate serious violations of environmental stipulations.[3]

Monitoring Process

Fish and wildlife and other government monitors were sent into the field with little more than the charge to "enforce the stipulations." With some exceptions, JFWAT monitors had little or no experience in construction projects, and their knowledge of related physical processes potentially affecting fish and wildlife resources was limited. There was great inconsistency from section-to-section in defining problems, in scaling them for significance, and in determining what actions should be taken to resolve them. Moreover, the biologists (as well as other monitors) were often perplexed and frustrated by the lack of clearly defined roles, authorities, and procedures in the field. Lines of communication were unclear and often tangled; messages were frequently distorted, delayed, or blocked as they were passed through the circuitous channels from JFWAT monitor to AOFR to central office to Alyeska to execution contractor to construction foreman to laborer. And the documentation of field activities reflected these erratic and inconsistent aspects of the monitoring process.

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[3] See *Alaska Natural Gas Transportation Act of 1976*, Public Law 94-586, October 22, 1976, Section 11.

Recommendations relating to the monitoring process are as follows:

1. Develop field manuals for all monitors. They should include basic information on mitigative techniques such as erosion control; types of soils; selection, uses, and maintenance of material sites; fish passage structures; sampling and testing methods; monitoring procedures; documentation requirements; and background discussions of environmental concerns such as sensitivity of fish to blasting at different life stages, significance of culvert velocity criteria, and sensitivity of nesting, lambing, spawning, and other critical biological habitat.
2. Establish criteria and procedures for reporting violations of project stipulations and follow-up action on such reports.
3. Authorize AOFRs (or their equivalents) to communicate directly and officially with execution contractors in the field to resolve immediate problems that, in the AOFRs' judgement, require such direct action.
4. All field monitoring documents including field logs should include reference to specific stations and alignment sheets for each entry; all field monitors should keep logs; and follow-up actions on reported violations should be fully documented.

Fish and Wildlife Information

Project and environmental information are interrelated elements of a comprehensive data base for a surveillance program. In the TAPS case there were serious deficiencies in both of these kinds of information. It is unrealistic to expect that information will ever be complete for all of the purposes it ideally serves in project planning and monitoring, and this is surely so in a project of the magnitude and complexity of TAPS. What can be expected, however, is that pre-construction planning identify the likely range of information needs, determine what is known and what is not known, and establish priorities for filling critical information gaps. The environmental impact statement process is the logical place to systematically assess the adequacy of project, environmental, and impact information, to evaluate the benefits and costs of higher levels of information, and to suggest priorities for pre-construction, construction, and post-construction study programs.

Recommendations concerning fish and wildlife information development are:

1. Use the EIS process to plan a comprehensive information development program, including analysis of trade-offs between higher information levels and expedited construction.
2. Within the framework of such a plan, set preconstruction research requirements as appropriate for additional stream surveys, studies of fisheries, characteristics of big game, habitat surveys of potentially endangered species and of related critical biological areas.

Industry Responsibility

Effective government surveillance, in all aspects of design review and construction monitoring, depends on how well industry fulfills its responsibilities for designing a project and monitoring contractor construction work in the field. Industry's incentives to assure the structural integrity of a project are greater, however, than its incentives to assure additional degrees of environmental protection beyond that which follows as a by-product of structural integrity. Thus, government must impose reasonable environmental protection requirements on industry and effectively enforce them. In these matters, there was considerable slippage on both government and industry sides in the TAPS case.

Recommendations in the area of industry responsibility for effective design and monitoring are:

1. Initiate project criteria and preliminary design development at the earliest possible time.
2. Government should provide detailed environmental criteria (such as the stream-culvert velocity, big game crossing, and construction window standards used in the TAPS case) to permittees at an early date, and require their inclusion in project criteria and designs.
3. Establish a complete reference library containing supporting technical and environmental documentation for all design submissions early in the planning phase and maintain this documentation throughout construction. Locate the library in the city where the government surveillance organizations are based.
4. The right-of-way agreement or other authorizing instrument should require that a fully acceptable quality assurance/quality control program must be approved before issuance of notices to proceed. In addition to those mandatory criteria listed in section nine of the TAPS agreement, government should require:[4]
    a. a QA/QC organization structurally separate from construction management at every level;
    b. appropriately trained and adequately staffed environmental and technical QC components;

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[4] See also Quality Assurance Criteria for Nuclear Power Plants (10 CFR 50).

c. field level stop work authority, with orders issuable directly to execution contractors;
d. establishment of varying but definite time frames for clearance of reports of stipulation violations including requirements for field checks of actual corrections; and
e. periodic government audits of QA/QC organization and documentation, and notification to AOFRs of all stipulation violations reported and stop work orders issued.

Concluding Comment

Fish and wildlife aspects of surveillance are dependent on and cannot be separated from other elements of the system and the conditions under which it operates. They are affected by the basic priorities defining government involvement in the project, the premises and performance of industry's role, and the structure of surveillance organizations. These factors have therefore been included within the scope of this study as necessary grounding for the analysis of more specific fish and wildlife-related problems, including information needs, surveillance management, and the interaction of biologists and engineers in office and field.

Appendixes

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Appendix A

Selected Portions of Stipulations for the Agreement and Grant of Right-of-Way for the Trans-Alaska Pipeline

1. General

1.3.2. The Authorized Officer may require Permittees to make such modification of the Pipeline System, without liability or expense to the United States, as he deems necessary to: protect or maintain stability of geologic materials; protect or maintain integrity of the Pipeline System; prevent serious and irreparable harm to the environment (including but not limited to fish or wildlife populations, or their habitats); or remove hazards to public health and safety.

.1.5.2. Permittees shall comply with each and every lawful order directed to them and that is issued by the Secretary, the Authorized Officer or by any duly authorized representative of the Authorized Officer.

1.7.1.1. Permittees shall not initiate any construction of the Pipeline System without prior written permission of the Authorized Officer. Such permission shall be given solely by means of a written Notice to Proceed issued by the Authorized Officer. Each Notice to Proceed shall authorize construction only as therein expressly stated and only for the particular Construction Segment therein described.

1.7.1.2. The Authorized Officer shall issue a Notice to Proceed only when in his judgment the construction (including design) and operation proposals are in conformity with the provisions of these Stipulations.

1.7.1.3. By written notice, the Authorized Officer may revoke in whole or in part any Notice to Proceed which has been issued when in his judgment unforeseen conditions later arising require alterations in the Notice to Proceed in order to: protect or maintain stability of geologic materials; protect or maintain integrity of the Pipeline System; prevent serious and irreparable harm to the environment (including but not limited to fish or wildlife populations, or their habitats); or remove hazards to public health and safety.

1.7.2.1. Prior to applying for a Notice to Proceed for any Construction Segment, Permittees shall submit the Preliminary Design for that Segment to the Authorized Officer for approval. Where appropriate, each submission shall include the criteria which justify the selection of the Construction Modes. The Authorized Officer shall expeditiously review each submission and shall do so within thirty (30) days from the date of his receipt of the submission. The Authorized Officer may request additional information if he deems it necessary.

1.7.2.2. In appropriate cases, the Authorized Officer may waive the requirement that a Preliminary Design be submitted. In the circumstance, Permittees may proceed to apply for a Notice to Proceed in accordance with Stipulation 1.7.4.

1.7.4.1. Permittees may apply for a Notice to Proceed for only those Contruction Segments for which the Preliminary Design has been approved in writing by the Authorized Officer or a waiver pursuant to Stipulation 1.7.2.2. has been issued in writing by the Authorized Officer.

1.7.4.2. Before applying for a Notice to Proceed for a Contruction Segment, Permittees shall, in such manner as shall be acceptable to the Authorized Officer, by survey, locate and clearly mark on the ground the proposed centerline of the line pipe to be located in the Mapping Segment within which the Construction Segment is to be constructed and the location of all Related Facilities proposed to be constructed in the Mapping Segment.

1.7.4.3. Each application for a Notice to Proceed shall be supported by:

(1) A Final Design.

(2) All reports and results of environmental studies conducted or considered by Permittees.

(3) All data necessary to demonstrate compliance with the terms and conditions of these Stipulations with respect to that particular Construction Segment.

(4) A detailed network analysis diagram for the Construction Segment, including: Permittees' work schedules; consents, permits or authorizations required by State and Federal agencies and their interrelationships; design and review periods; data collection activities; and construction sequencing. The detailed network analysis diagram shall be updated as required to reflect current status of the project.

(5) A map or maps, prepared in such manner as shall be acceptable to the Authorized Officer, depicting the proposed location in the Mapping Segment within which the Construction Segment is to be constructed of: (1) the boundaries of all contiguous temporary use areas, and (2) all improvements, buried or aboveground, that are to be constructed within the Mapping Segment. The Authorized Officer shall not issue a Notice to Proceed with construction until he has approved all relevant locations on the ground and temporary boundary markers have been set by Permittees to the satisfaction of the Authorized Officer.

(6) Such other data as may be requested by the Authorized Officer either before submission of the application for a Notice to Proceed or at any time during the review period.

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2. Environmental

2.2.2.1. Permittees shall comply with applicable "Water with the Pipeline System in a manner that will avoid or minimize degradation of air, land and water quality. In the construction, operation, maintenance and termination of the Pipeline System, Permittees shall perform their activities in accordance with applicable air and water quality standards, related facility siting standards, and related plans of implementation, including but not limited to standards adopted pursuant to the Clean Air Act, as amended, 42 U.S.C. Section 1857 et seq., and the Federal Water Pollution Control Act, as amended, 33 U.S.C. Section 1321 et seq.

2.2.2.1. Permittees shall comply with applicable "Water Quality Standards" of the State of Alaska as approved by the Environmental Protection Agency.

2.2.2.2. Mobile ground equipment shall not be operated in lakes, steams or rivers unless such operation is approved in writing by the Authorized Officer.

2.3.3.1. The Pipeline System shall be located so as to provide three hundred (300) foot minimum buffer strips of undisturbed land along streams unless otherwise approved in writing by the Authorized Officer.

2.4.1.1. Permittees shall perform all Pipeline System construction, operation, maintenance and termination activities so as to avoid or minimize disturbance to vegetation.

2.4.1.2. The design of the Pipeline System shall provide for the construction of control facilities that will avoid or minimize erosion.

2.4.1.3. The erosion control facilities shall be constructed to avoid induced and accelerated erosion and to lessen the possibility of forming new drainage channels resulting from Pipeline System activities. The facilities shall be designed and operations conducted in such a way as to avoid or minimize disturbance to the thermal regime.

2.4.2.1. Surface materials taken from disturbed areas shall be stockpiled and utilized during restoration unless otherwise approved in writing by the Authorized Officer. Stabilization practices, as determined by the needs for specific sites, shall include but shall not be limited to seeding, planting, mulching, and the placement of mat binders, soil binders, rock or gravel blankets, or structures.

2.4.2.2. All disturbed areas shall be left in a stabilized condition satisfactory to the Authorized Officer. Such satisfaction shall be stated in writing by the Authorized Officer.

2.4.3.1. Permittees shall prevent or minimize erosion at stream and river crossings and those parts of the Pipeline System within flood plains, as defined in Stipulation 3.6.

2.4.3.2. Temporary access over stream banks shall be made through use of fill ramps rather than by cutting through stream banks, unless otherwise approved in writing by the Authorized Officer. Permittees shall remove such ramps upon termination of seasonal or final use. Ramp materials shall be disposed of in a manner approved in writing by the Authorized Officer.

2.4.4.1. Seeding and planting of disturbed areas shall be conducted as soon as practicable and, if necessary, shall be repeated until vegetation is successful, unless otherwise approved in writing by the Authorized Officer. All other restoration shall be completed as soon as possible.

2.5.1.1. Permittees shall provide for uninterrupted movement and safe passage of fish. Any artificial structure or any stream channel change that would cause a blockage to fish shall be provided with a fish passage structure or facility that meets all Federal and State requirements. The proposed design shall be submitted to the Authorized Officer in accordance with Stipulation 1.7.

2.5.1.2. Pump intakes shall be screened to prevent harm to fish.

2.5.1.3. Abandoned water diversion structures shall be plugged and stabilized to prevent trapping or stranding of fish.

2.5.1.4. If material sites are approved adjacent to or in certain lakes, rivers, or streams, the Authorized Officer may require Permittees to construct levees, berms, or other suitable means to protect fish and fish passage and to prevent siltation of streams or lakes.

2.5.2.1. "Fish Spawning Beds" means the areas where anadromous and resident fish deposit their eggs.

2.5.2.2. Permittees shall avoid channel changes in Fish Spawning Beds designated by the Authorized Officer; however, where channel changes cannot be avoided in such beds, new channels shall be constructed according to written standards supplied by the Authorized Officer.

2.5.2.3. Fish Spawning Beds shall be protected from sediment were soil material is expected to be suspended in water as a result of construction activities. Settling basins shall be constructed to intercept silt before it reaches streams or lakes.

2.5.2.4. Permittees shall comply with any special requirements made by the Authorized Officer for a stream system in order to protect Fish Spawning Beds. Permittees shall repair all damage to Fish Spawning Beds caused by construction, operation, maintenance or termination of the Pipeline System.

2.5.3.1. Permittees' activities in connection with the Pipeline System in key fish and wildlife areas may be restricted by the Authorized Officer during periods of fish and wildlife breeding, nesting, spawning, lambing or calving activity and during major migrations of fish and wildlife. The Authorized Officer shall give Permittees written notice of such restrictive action. From time to time, the Authorized Officer shall furnish Permittees a list of areas where such actions may be required, together with anticipated dates of restriction.

2.5.4.1. Permittees shall construct and maintain the Pipeline, both buried and aboveground sections, so as to assure free passage and movement of big game animals.

2.6.2.1. Material site boundaries shall be shaped in such a manner as to blend with surrounding natural land patterns. Regardless of the layout of material sites, primary emphasis shall be placed on prevention of soil erosion and damage to vegetation.

2.7.2.5. All debris resulting from clearing operations and construction that may block stream flow, delay fish passage, contribute to flood damage, or result in stream bed scour or erosion shall be removed.

2.8.1. All activities of Permittees in connection with the Pipeline System that may create new lakes, drain existing lakes, significantly divert natural drainages, permanently alter stream hydraulics, or disturb significant areas of stream beds are prohibited unless such activities along with necessary mitigation measures are approved in writing by the Authorized Officer.

2.9.1. Permittees shall not operate mobile ground equipment off the Right-of-Way, Access Roads, State Highways, or authorized areas, unless approved in writing by the Authorized Officer or when necessary to prevent harm to any person.

2.11.1. Permittees shall submit a plan for use of explosives, including but not limited to blasting techniques, to the Authorized Officer in accordance with Stipulation 1.7.

2.11.2. No blasting shall be done under water or within one-quarter (1/4) mile of streams or lakes without a permit from the Alaska Department of Fish and Game, when such a permit is required by State law or regulation.

2.12.1. Areas disturbed by Permittees shall be restored by Permittees to the satisfaction of the Authorized Officer as stated in writing.

2.13.1. A discharge of Oil by Permittees into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone in violation of the Federal Water Pollution Control Act, as amended, 33 U.S.C. Section 1321 et seq. and the regulations issued thereunder, or in violation of applicable laws of the State of Alaska and regulations issued thereunder, is prohibited. Permittees shall give immediate notice of any such discharge to: (1) the Authorized Officer; and (2) such other Federal and State officials as are required by law to be given such notice.

2.14.1. It is the policy of the Department of the Interior that there should be no discharge of Oil or other pollutant into or upon lands or waters. Permittees must therefore recognize their prime responsibility for the protection of the public and environment from the effects of spillage.

3. Technical

3.2.2.1. The design shall also provide for remotely controlled shutoff valves at each pump station; remotely controlled mainline block valves (intended to control spills); and additional valves located with the best judgment regarding wildlife habitat, fish habitat, and potentially hazardous areas.

3.2.2.2. All practicable means shall be utilized to minimize injury to the ground organic layer.

3.2.2.4. Permittees shall provide for continuous inspection of Pipeline System construction to ensure compliance with the approved design specifications and these Stipulations.

3.6.1.1.1.1. The Pipeline shall cross streams underground unless a different means of crossing is approved in writing by the Authorized Officer.

6.1.1.1.6. The pipe trench excavation shall stop an adequate distance from the water crossing to leave a protective plug (unexcavated material) at each bank. These plugs shall be left in place until the stream bed excavation is complete and the pipe laying operation is begun. The plugs shall not be completely removed until absolutely necessary. The trench shall be backfilled with stable material as soon as the pipe is laid.

3.6.2.1. Where necessary because of outfall erosion, stilling basins shall be constructed at the outflow end of culverts. To prevent erosion, the pool sides shall be stabilized by appropriate methods; e.g., by the use of riprap.

3.6.2.2. Slopes of cuts through stream banks shall be designed and constructed to minimize erosion and prevent slides.

3.6.2.3. Erosion control procedures shall accommodate and be based on the runoff produced by the maximum rainfall rate and snow melt rate combination reasonably characteristic of the region. The procedures shall also accommodate effects that result from thawing produced by flowing or ponded water on permafrost terrain.

3.9.1. All construction, operation, maintenance, and termination activities in connection with the Pipeline System shall be conducted so as to avoid or minimize thermal and other environmental changes and to provide maximum protection to fish and wildlife and their habitat, and people.

All working platforms, pads, fills and other surface modifications shall be planned and executed in such a way that any resulting degradation of permafrost will not jeopardize the Pipeline foundations.

3.9.2. Acceptable plans, procedures and quality controls that ensure compliance with Stipulation 3.9.1. shall be submitted in accordance with Stipulation 1.7.

Appendix B

The Jurisdictions of the Federal and State Governments Over the Construction of the Trans-Alaska Pipeline

by
H. Clifton Eames, Jr.
Trustees for Alaska

1. Introduction

This study of the federal-state jurisdictional issues presented by the construction of the trans-Alaska pipeline is not meant to be exhaustive. Neither all of the issues that actually arose, nor all of the issues that might have arisen, will be examined. The pipeline project was too immense, and the legal questions are too complex, for this to be possible without taking a great deal more time. In addition, a major desire of both the federal and state governments was to avoid getting bogged down in court actions.[1] One of the reasons for this not unnatural reluctance was undoubtedly the wish to avoid needless conflict and wasteful expenditures of time and money.[2] But more important probably were the Congressional declarations in the TAP Act that "[t]he early development and delivery of oil and gas from Alaska's North Slope to domestic markets is in the national interest because of growing domestic shortages and increasing dependence upon insecure foreign sources"[3] and that "[t]he earliest possible construction of a trans-Alaska oil pipeline . . . will best serve the national interest."[4] The federal government, and perhaps the State as well, undoubtedly felt bound by the Congressional mandate, clearly implied both in these declarations and elsewhere in the Act, to avoid all unnecessary delays. In any case, both governments probably believed, in general at least, that the speedy construction of the pipeline was in fact in the interest of both the nation and the State of Alaska. Consequently, many problems were resolved, prior to the beginning of construction, through the negotiations that culminated in the signing of the Cooperative Agreement.[5] Those that arose subsequently were almost all handled informally, without resorting to the courts. As a result, some legal issues were probably never spotted, and of those that were, very few have been developed and analyzed as fully as they would have been had they been briefed for judicial resolution.[6]

What we have done, therefore, is examine the two general jurisdictional issues which encompass virtually every other such issue: the ownership of Alaska's publicly-owned lands[7] and the reach of the State's police power jurisdiction. The question of land ownership was basic to pipeline construction. It determined whether the federal government or the State of Alaska would issue the right-of-way or other authorization for the particular geographic area involved, and through the terms and stipulations of the authorization have general control over construction activities in that area.[8] At issue was not only the land needed for the laying of the pipeline itself, but land for related facilities such as pump stations, communications sites, temporary camps, storage sites, gravel pits, and access roads.[9]

The determination of land ownership, then, and the enforcement by each government of the terms and stipulations in the various authorizations covering its respective lands, is one way that jurisdiction over the construction of the pipeline was in effect divided up. The failure of Alyeska to perform in accordance with any of these contractual provisions would subject it to sanctions for breach of contract.[10] The first half of this study, therefore, will be devoted primarily to the question of land ownership.

A very different jurisdictional issue concerns the enforcement of the environmental protection laws of the two governments, through the imposition of civil or criminal sanctions for their violation. There is ordinarily little question of the power of the federal government to enforce its laws on state lands. The real issue, therefore, is the extent of the State's police power jurisdiction over the federal lands. (The power of the State to regulate federal facilities or activities is a separate question which was not a serious one in the construction of the pipeline since it was basically a private, not a governmental, project.) The reach of the police power, though, does not in most cases (and virtually never did along the pipeline right-of-way) turn on the determination of land ownership by itself; the fact that land is federally-owned is generally important only in that it gives Congress an additional constitutional basis for legislating. As a general rule, for the purpose of protecting the health, safety and general welfare of its citizens a state may regulate the activities of private parties, such as Alyeska, on the federal lands. Where federal legislation exists, however, the state's regulations can be preempted.

Consequently, on the pipeline the crucial issue of state regulatory power over the federal lands was whether Alaska's environmental protection laws were preempted by two pieces of federal pipeline legislation, the TAP Act and the amendment to Section 185 of the Mineral Leasing Act of 1920.[11] (Although the federal and state governments attempted to resolve this issue contractually in the Cooperative Agreement, they were unable completely to lay it to rest since Alyeska was not a party to the Agreement and consequently was not bound by it. As a result, Alyeska was free to raise these issues in criminal prosecutions against it brought by the State, to which the federal government was not a party.) The second half of this study will be devoted to both that specific issue and the larger question of preemption.

II. Land Ownership

A. Surface Lands.

Land ownership would have been only a minor issue if the pipeline were to have been constructed in one of the older states. Then the pattern of federal-state ownership would have been for the most part established. But Alaska had only relatively recently been admitted to the Union and the process of patenting lands to the State was far from complete. Furthermore, additional uncertainties had been created by the passage of the Alaska Native Claims Settlement Act (hereinafter "Settlement Act").[12]

Section 6(b) of the Statehood Act provides that "the State of Alaska . . . is hereby granted and shall be entitled to select . . not to exceed one hundred and two million five hundred and fifty thousand acres from the public lands of the United States in Alaska. . . ."[13] Section 6(g) then provides that "all lands duly selected by the State of Alaska pursuant to this Act shall be patented to the State by the Secretary of the Interior. Finally, additional language in Section 6(g) provides that the State may execute conditional leases and make conditional sales of land that has been tentatively approved, even though a final patent has not yet been issued.

In the early 1970s, as now, some land selected by Alaska had not yet been tentatively approved; other land had been tentatively approved but not yet patented. The status of these two categories of unpatented land was unclear, and the question that presented itself was who owned them for the purpose of granting the right-of-way and other authorizations.

The cases do not provide a conclusive answer. First of all, the ones that might otherwise be helpful deal with in place and in lieu grants, instead of quantity grants[14] (although one of the statutes that was construed did govern both in lieu and quantity grants[15]). Since Alaska was given quantity grants, it could be argued that the in lieu cases are inapplicable. We feel that it is reasonable to conclude, however, that Alaska became the equitable owner of the lands it selected as soon as it had done so and that the only power left to the federal government was the "judicial" one of determining whether the selection had been properly and lawfully made.[16]

Even if Alaska did become the equitable owner of its selections, however, until the final patent was issued the federal government was still the legal owner. Consequently, neither government had all of the incidents of ownership, and in many cases a final determination of ownership would not be able to be made before pipeline construction was to begin. A further complication was the uncertain effect of both tentative approval and the provision in the Statehood Act providing for conditional leases or sales of tentatively approved land.[17]

Rather than go to court, these issues were resolved in the Cooperative Agreement. Certain categories of lands were no problem. Alaska would issue its right-of-way authorization for lands already patented to it and for lands beneath navigable waters.[18] The federal government would issue its authorization for federal lands not selected by the State.[19] Furthermore, apparently since tentative approval would ordinarily be virtually, though not legally, tantamount to final patent,[20] Alaska would issue its authorization for most tentatively approved lands.[21]

Lands selected by the State but not tentatively approved were to be treated specially. Although this is a considerable simplification of the actual procedure, basically both the federal and state governments would include these lands in their authorizations; the procedure for tentatively approving or patenting the lands would be expedited; and one or the other of the authorizations would become effective based on the outcome of those expedited procedures.[22]

This left just one category of lands, those selected by the State, whether tentatively approved or not, which were later withdrawn by Section 11(a)(2) of the Settlement Act.[23] That section withdrew for village selection lands that were contiguous to the villages even if they had been selected by the State and tentatively approved. Alaska could plausibly have argued that Congress without compensation had taken lands of which the State was the equitable owner. In spite of this, it agreed that the federal government would grant the right-of-way for these lands,[24] apparently acquiescing in the withdrawal. At that time, however, it was thought that passage of the Settlement Act would remove the major obstacle to construction of the pipeline, which the State very much desired; apparently it was willing to let the withdrawal go unchallenged in order to hasten the beginning of construction.

B. Lands Beneath Navigable Waters.

Rights-of-way and other authorizations were issued for submerged lands as well as for surface lands; consequently, whether the federal or state government owned particular pieces of submerged land along the right-of-way was important for the same reasons. Under the Cooperative Agreement Alaska was to issue its right-of-way authorization for lands beneath navigable waters. The applicable definition of such lands in the Submerged Lands Act,[25] however, contain two exceptions to the general rule that they are owned by the States (lands beneath non-navigable waters on federal land are generally owned by the federal government).

First of all, Section 1301(f) excludes one rather technically defined category of lands which might otherwise seem to be included.[26] More importantly, though, Section 1313 contains a description of several additional categories of lands that were not confirmed to the States. These include "all lands expressly retained by or ceded to the United States when the State entered the Union . . . and any rights the United States has in lands presently and actually occupied by the United States under claim of right." Lands beneath navigable waters, however, are not automatically included in all such withdrawals. In fact, the general rule seems to be just the opposite. The cases consistently hold that "[L]and under navigable waters in acquired territory is generally held for the ultimate benefit of future states and . . . disposals by the United States during the territorial period are not lightly to be inferred and should not be regarded as intended unless the intention was definitely declared or otherwise made very plain" (emphasis deleted).[27]

To determine which pre-admission withdrawal included such lands, the order or statute which accomplished the withdrawal must generally be looked to. Two pieces of land beneath navigable waters, though, that we know were retained are the land under Lake Tustemena in the Kenai Moose Range and the land set aside in Anchorage in 1915 for the Alaska Railroad Terminal Reserve.[28] We do not know, however, about the many acres of land in the northern half of Alaska that were withdrawn for national defense purposes during World War II.

Whether the lands beneath navigable waters in those areas passed to the State is apparently not clear, nor is the effect of the revocation of that withdrawal after statehood.[29]

A more common question is when a river is "navigable" for title purposes. The United States Supreme Court, several decades ago, held that federal, not state law, is controlling.[30] The federal title test of navigability requires "navigability in fact" and has six parts.[31] First of all, the body of water does not have to have ever actually been navigated; it need only be susceptible to navigation.[32] Secondly, it must be susceptible to navigation for not just any purpose, but for commerce.[33] Third, it must be susceptible to such navigation in its "natural and ordinary condition," although "occasional difficulties in navigation" do not destroy navigability.[34] Fourth, the navigation can be by any "customary mode" of trade or travel.[35] Fifth, the question of navigability is decided as of the time the State was admitted to the Union.[36] Finally, the water need not be a highway for interstate commerce;[37] for example, it can be entirely landlocked and entirely within one state.

Unfortunately, the test is not an easy one to apply.[38] One reason is that many problematical fact situations have yet to be dealt with by the courts. Another is that while the test of navigability for title purposes is different, and less broad, than the ones for admiralty and regulatory purposes, the Court has frequently in title cases cited admiralty or regulatory decisions. In spite of this practice, however, not all navigability decisions are applicable to title cases, and they cannot be mechanically applied. For example, in 1940 the Court held that if obstacles to navigation could be removed through the use or construction of artificial improvements, the body of water was deemed to be navigable for regulatory purposes.[39] Since this is not true for title purposes, in cases subsequent to this decision one must be wary of holdings that "occasional difficulties in navigation" do not defeat navigability.

In any case, the Supreme Court's test of navigability was apparently used when title to the lands beneath navigable waters along the pipeline right-of-way was determined for the purpose of establishing which government would issue its authorization for particular water crossings.[40] A photo map of each crossing was examined, and in those borderline situations where navigability was uncertain, the parties compromised.[41] The most difficult problems arose over the navigability of braided rivers, since the Court has apparently never directly addressed that issue.[42]

C. The Haul Road.

The haul road did not present the same land ownership issues that the pipeline right-of-way did. It was not a private project requiring authorizations from the government landowners along its right-of-way. Although the actual construction was to be contracted out to Alyeska, the haul road was to be built by the State of Alaska as a public highway. Consequently, the only significant jurisdictional issue was whether the State was required to obtain a permit from the federal government for those portions that crossed federal land, or whether it could proceed without a permit pursuant to 43 U.S.C. §932 (also referred to as R.S. §2477).

Section 932, which was part of a statute passed in 1866, read: "The right of way for the construction of highways over public lands, not reserved for public uses, is hereby granted."[43] In *Wilderness Society v. Morton*, decided after the federal and state governments had come to an agreement, the court held that the haul road right-of-way was valid under that section;[44] it said that the section acted "as a present grant which takes effect as soon as it is accepted by the State" and that "[a]ll that is needed for acceptance is some 'positive act on the part of the appropriate public authorities of the state, clearly manifesting an intention to accept.' "[45] Normally, said the court, it is "not even necessary for the builder of the highway to apply for a right-of-way."[46] The court never addressed the issue that was raised in *United States v. Dunn* four and a half months later.[47]

In *Dunn*, the court argues in a footnote that Section 932 "was passed to protect persons who have already encroached upon the public domain without authorization but who have been allowed to remain there with the knowledge and acquiescence of the government and who should not in conscience be deemed trespassers. It was not intended to grant rights, but instead to give legitimacy to an existing status otherwise defensible."[48] If *Dunn* is correct, not *Wilderness Society v. Morton*, Alaska was not entitled to construct the haul road without first obtaining a permit from the federal government.[49]

The issue first arose, however, before either of these cases had been decided. The State contended that it did not need to obtain a permit, the federal government that it did. Should the issue be tested in court, though, which both parties hoped to avoid, and should the State prevail, it would be free to proceed unfettered by the environmental and other stipulations attached to the issuance of a permit. Since under Section 203(b)[50] of the TAP Act the federal government was probably required to issue a permit anyway, a compromise was reached: the federal government agreed to issue all necessary permits and the State agreed to enforce a number of stipulations that were attached as an exhibit to the Cooperative Agreement.[51] By participating in the drafting of those stipulations, the federal government was able at least indirectly to influence the construction of the highway.[52]

III. State Police Power Jurisdiction Over Activities on Federal Lands

A. In General.

Land ownership determined whether the federal or state government would issue the right-of-way authorization, and enforce the terms and stipulations of that authorization, for each parcel of land over which the pipeline passed. By itself, however, ownership is not ordinarily conclusive as to the power of the state to enforce its environmental protection laws on the federal lands. That issue will be the subject of this section.

The controlling principle in this area of the law, derived from the Supremacy Clause of the Constitution,[53] is that "the constitution and the laws made in pursuance thereof are supreme; ... they control the constitution and laws of the respective states, and cannot be controlled by them."[54] It follows from this, broadly stated, "that the states have no power, by taxation or otherwise, to retard, impede, burden, or in any manner control, the operation of the constitutional laws enacted by congress. ..."[55]

On the other hand, the Tenth Amendment to the Constitution reserved to the state broad power to protect and promote the health, safety and general welfare of its citizens.[56] State environmental laws are enacted pursuant to this power (the "police power"), and the courts have often said both that environmental protection is an area which the States have "traditionally occupied"[57] and that the "historic police powers of the

States are not to be superceded" by federal legislation "unless that was the clear and manifest purpose of Congress."[58]

Finally, the concept of exclusive versus concurrent jurisdiction is fundamental to this area. Where Congress has exclusive jurisdiction over either a subject matter or its land, the States are prohibited from legislating. Where Congress and the States have concurrent jurisdiction, absent congressional intention to preempt the States they are free to legislate as long as there is no conflict with federal legislation.

B. The Federal Lands.

We have mentioned that in general the States are not precluded from regulating activities on federal lands by federal ownership itself. The exception to this rule concerns what are termed "Article I lands."

1. Article I Lands.

Article I, Section 8, Clause 17 of the Constitution ("Cession Clause") gives the Congress exclusive jurisdiction over a relatively limited category of federal lands. It provides that "The Congress shall have power . . . [t]o exercise exclusive legislation . . . over . . . [the District of Columbia] . . . and . . . all places purchased by the consent of the legislature of the State in which the same shall be, for the erection of forts, magazines, arsenals, dockyards, and other needful buildings."[59] The Cession Clause has been broadly construed and can include land used not just for military purposes, but for any legitimate governmental purpose (a national park, for example).[60]

One important qualification, however, is that the land must be "purchased by the consent" of the state legislature. Furthermore, in some cases a state will give a qualified grant of consent, reserving to itself either the full power of concurrent jurisdiction, or something less than that, for example the power to serve process within the enclave regarding acts committed outside of it.[61] In other cases it might withhold its consent but make a cession with similar qualifications.[62] Consequently, some lands that, judged by their purpose, might appear to be Article I property are not in fact under the exclusive jurisdiction of federal government. The true extent of a state's jurisdiction, if any, cannot be determined without reference to the actions of the state legislature at the time the property was acquired by the federal government.

In Alaska, Section 11(b) of the Statehood Act reserved authority in the United States for the exercise by Congress of the Article I power of exclusive legislation "in all cases whatsoever over such tracts or parcels of land as, immediately prior to the admission of said State, are owned by the United States and held for military, naval, Air Force, or Coast Guard purposes, including naval petroleum reserve numbered 4,"[63] however acquired. There are three provisos to the section, however, and the second one virtually emasculates it, in effect authorizing the exercise of concurrent jurisdiction by the State.[64]

2. Article IV Lands.

Relatively few federal lands are Article I lands, since most of them have not been purchased (or acquired through the exercise of the power of eminent domain) with the consent of the state. For example, apparently the only Article I lands over which the pipeline right-of-way passed are approximately 27 miles of military land. The larger portion of the federal lands, and virtually all such land under the right-of-way, are governed pursuant to Article IV, Section 3, Clause 2 ("Property Clause") of the Constitution: "The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States."

The federal government's power over Article IV lands is quite broad, and legislation passed pursuant to the Property Clause is fully capable of preempting state law.[65] In *Kleppe v. New Mexico*[66] the State argued that the Property Clause gave Congress only two powers: the powers to regulate the disposal of its property and to protect its property.[67] The Supreme Court rejected such a narrow interpretation and said that " '[t]he power over the public land thus entrusted to Congress is without limitations.' "[68] "In short, Congress exercises the powers both of a proprietor and of a legislature over the public domain. . . . In our view, the 'complete power' that Congress has over public lands necessarily includes the power to regulate and protect the wildlife living there."[69]

Although *Kleppe v. New Mexico* made it clear that Congress has broad powers to legislate under the Property Clause and to preempt state law thereby if it wishes, that does not mean that the States may never regulate activities on federal lands. This is true only where the federal government has exclusive jurisdiction.[70] The general rule with regard to Article IV property is that "[t]he police power of the State extends over the federal public domain, at least when there is not legislation by Congress on the subject."[71] Consequently, most questions of the extent of state police power jurisdiction, including most of those that arose during the pipeline construction, are answered by determining whether particular attempted exercises of that power are preempted or prohibited by either the Constitution or, more commonly, by lawfully enacted federal legislation.

C. Preemption.

This is a difficult area of the law to conceptualize. As many courts and commentators have said, a multitude of tests have been formulated to determine when a state regulation has been preempted. Furthermore, which of these are specific tests and which are general rules is not always clear. Nevertheless, a broad sketch of the preemption doctrine can certainly be made. To make it more understandable, and its applicability to pipeline construction more apparent, we will integrate into it a discussion of two lawsuits that for convenience we will refer to as *Alyeska-1*[72] and *Alyeska-2*,[73] (collectively, the "pipeline lawsuits"). Both are actions involving alleged violations of certain of Alaska's environmental laws found in Alaska Statutes Title 46, Chapter 03. In the first case Alyeska was accused of discharging oil in violation of Sections 710 and 740; in the second, with constructing a sewage system or treatment works without submitting plans to the Department of Environmental Conservation, and without obtaining a permit, in violation of Section 720.

1. Two Preliminary Issues.

Preemption, or something very much like it, can occur even in the absence of federal legislation. For example, as we noted earlier, unless Congress clearly and unambiguously permits it, federal facilities, agents, instrumentalities and activities cannot be regulated by the States.[74] The pipeline presents an interesting question in this regard. Although Alyeska would seem to be merely a private party, not a federal agent or instrumentality, and the construction of the pipeline a private project, not a federal one, the federal involvement was sufficiently substantial that it might be argued that Alyeska had some of the attributes of a federal agent, and the project some of the attributes of a federal project, and that consequently they could not be regulated by the State. The grounds for the argument would include Congress's declaration that "early development ... is in the national interest because of ... increasing dependence upon insecure foreign sources";[75] its authorization of the appropriate federal officers and agencies to issue and take all necessary action to administer and enforce the authorizations necessary for or related to the pipeline's construction, operation and maintenance;[76] its authorization of the waiver by those officers and agencies of any procedural requirements which they deemed desirable to waive to accomplish the purposes of the Act;[77] its virtual suspension of NEPA, at least as it regarded the Impact Statement requirement;[78] and its virtual preclusion of judicial review of the issuance of the necessary authorizations.[79] Nevertheless, the argument would probably not prevail and in fact does not appear to have been raised in either of the pipeline lawsuits.

Secondly, it might also be argued that to enforce certain of the State's environmental laws would unconstitutionally burden the flow of interstate or foreign commerce,[80] or interfere with Congress's powers over foreign affairs[81] and the national defense.[82] In both cases, the state laws need not run up against federal legislation or a federal scheme of regulation to be unconstitutional.[83] Again, however, these issues appear not to have been raised in either of the pipeline lawsuits.

2. Preemption in Theory and in Practice.

Whenever it is asserted that Congress has preempted state regulation in a given area, the first issue, even if unstated, is always whether Congress had the constitutional power to legislate in that area. This will rarely provide a brake to federal action, however. Congress's authority under the Commerce Clause at times seems virtually limitless,[84] and as we noted earlier, the scope of the Property Clause also is very broad. Consequently, in neither pipeline lawsuit did Alyeska contend that Congress lacked the power to act.

Once it has been established that Congress is acting within its authority, both the federal and state legislation must be analyzed. Apparently Alyeska did not contend in either lawsuit that the state environmental statutes were preempted by their federal counterparts. Insofar as it regarded preemption, the defense in both cases seems to have been that the State's regulations were preempted by the TAP Act and Section 185 of the Mineral Leasing Act. These two statutes, then, comprise the relevant federal legislation for the purposes of this study.[85]

One of the less murky rules of preemption is that if it is physically impossible for the person regulated to comply with both the federal and state regulations, the state's cannot stand.[86] The cases seem to hold that physical impossibility does not result merely because one regulation is more stringent than the other. The reasoning apparently is that if the person regulated is in compliance with the more stringent one, he will also be in compliance with the other.[87] In any case, Alyeska does not seem to have contended that it could not have complied with both the two state regulations involved and the two federal statutes.

The broadest rule of preemption is that if Congress intended to preempt state regulation in a given area, the state regulations must fall.[88] In the simplest case, the federal legislation itself contains an express and unequivocal declaration of Congress's intention.[89] In both pipeline lawsuits Alyeska cited specific language in the TAP Act and in the Mineral Leasing Act which it said amounted to such a declaration. The argument, however, was not persuasive, and in *Alyeska-1*, which has already been decided in Alaska's favor, Judge Blair was unconvinced. On the other hand, the State cited two provisions from the Mineral Leasing Act which were at the very least strong indications that in enacting that Act Congress did not intend to preempt state regulation.[90] Furthermore, case support exists for this interpretation of those provisions.[91]

Even when Congress has not expressly declared its intention to preempt the States, however, this intention may be implied.[92] This was the crucial issue in the two pipeline lawsuits. The basic test seems to be whether under the circumstances the state regulation " 'stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress' "[93] or "whether both regulations can be enforced without impairing the federal superintendence of the field."[94] On the other hand, Congress's intent, as we said earlier, must be unmistakably clear,[95] and this is especially true when the field in question, like pollution control, is one which is traditionally within the scope of the States' police power.[96] Finally, Congress itself has often said that the primary responsibility for the control of pollution rests with state and local governments.[97]

Several more or less specific tests have been suggested to determine whether Congress has impliedly preempted a particular field. One is whether Congress's intention can be implied from the language of the statute (which we will discuss later) or from its legislative history.[98] Although Alyeska as well as the State quoted liberally from the legislative history of the federal legislation, Judge Blair was unable to find any clear indication of a congressional intent to preempt state regulation.

Another test is whether a regulatory scheme is so pervasive as to leave no room for state action,[99] although comprehensiveness and complexity do not by themselves evince an intent to preempt since some subject matters necessarily require comprehensive treatment.[100] In any case, in *Alyeska-1* the court virtually without explanation held that the federal scheme was not so pervasive as to preempt state regulation.

The execution and interpretation of federal legislation by the executive branch may also be looked to in ascertaining Congress's intent.[101] Since Section II.3 of the Cooperative Agreement indicates that the Interior Department felt that the State's police power jurisdiction had not been preempted, the State clearly had the stronger argument in this regard. The relevant language in that section reads as follows: "On lands subject to the Federal right-of-way authorization, where applicable statutes and regulations of the State providing for the protection of resources, the environment, or public health, safety or general welfare, impose additional requirements to, or more stringent standards than, those required by the Federal terms and stipulations for pipeline construction, operation or maintenance, the State law will control." Furthermore, the Supreme Court has said that [w]here coordinate state and federal efforts exist within a complementary administrative framework, and in the pursuit of common purposes, the case for federal preemption becomes a less persuasive one."[102] Notice, however, that the Cooperative Agreement has been cited in this context only because it might indicate whether or not Congress intended to preempt state action. Alyeska was not a party to the Agreement and is not bound by it.[103]

Two tests which are perhaps just different ways of saying the same thing are whether "a subject by its very nature ... [admits] only of national supervision" or "[demands] exclusive federal regulation in order to achieve uniformity vital to national interests";[104] two final tests are whether the state regulation has touched a field in which "the federal interest is so dominant" that the state regulation cannot stand, and whether the state regulation will "produce a result inconsistent with the objective of the federal statute" and likewise must be preempted.[105] (On the other hand, it has also been said that an exercise of a state's police power jurisdiction will only be superceded "where the repugnance or conflict is so 'direct and positive' that the two acts cannot 'be reconciled or consistently stand together.'"[106] Since Alyeska's basic argument might be relevant to any of them, we will consolidate our discussion of these last, more general tests, and of the question whether an intent to preempt can be implied from the language of the federal statutes.

Alyeska contended that Section 1652(b) of the TAP Act, part of which we quoted earlier, implies that Congress intended to preempt state regulation. That section authorized and directed the Secretary of the Interior to take all necessary action to administer and enforce the Department's right-of-way grant and other authorizations. The State argued, however, that while the Secretary was given the authority to take such action, and directed to do so, it does not follow that he was given exclusive authority. Judge Blair agreed with the State and cited against Alyeska Section 1653(b) of the TAP Act, which permits the Secretary "in cooperation with other Federal, State, or local agencies" to control and remove pollution by the holder of the right-of-way, at the holder's expense, when the holder fails to do so. The Judge also noted, perhaps irrelevantly, that dual environmental regulation increases the chances of adequately protecting Alaska's environment.

One final argument is that because of its perception of the importance of the pipeline to the economic welfare of the nation, and of the foreign affairs and national defense ramifications of our not having a sufficient supply of oil and of having to depend on "insecure foreign sources,"[107] Congress intended the federal government to have preemptive control over the pipeline's construction. The primary statutory indications of this strong congressional concern are the provisions of the TAP Act that we cited earlier as evidence of the federal involvement in the project.[108]

Alyeska presented this argument under the "need for uniformity" rubric,[109] but without explanation Judge Blair held that the construction of oil pipelines did not demand exclusive federal regulation in order to achieve a uniformity vital to national interests. Since the TAP Act dealt not with oil pipelines in general, but with a specific project, it might have been more persuasive for Alyeska to have argued that the federal interest was so dominant that regulation by the State was preempted,[110] or that state regulation stood as "an obstacle to the accomplishment ... of the full purposes and objectives of Congress."[111]

Nevertheless, the basic argument was considered by Judge Blair, and although he might have discussed it at more length, his decision was probably correct. Whether the result will be the same in *Alyeska-2*, however, or whether it would have been the same if the case had been tried in federal court, or if the federal government had been a party, is uncertain.

4. *Federal Environmental Laws.*

Although it was not contended in either of the pipeline lawsuits that Alaska's environmental laws had been preempted by federal environmental laws, it might be helpful to conclude by taking a very brief and general look at a few of the provisions in those federal laws which relate to preemption.[112]

a. Water Pollution—The federal water pollution scheme is embodied in the Federal Water Pollution Control Act, as amended.[113] The federal government has broad jurisdiction under this Act. Its jurisdiction extends to the navigable waters of the nation,[114] which are defined as "the waters of the United States . . . "[115] Although the precise meaning of this definition has not been established, it has been held to have extended the federal government's jurisdiction beyond what it was prior to the 1972 amendments.[116]

This does not mean that state regulation has been preempted, however. Besides being given a role to play in the federal scheme,[117] the States are free to enforce their own standards as long as they are not less stringent than the federal ones.[118] Federal facilities, though, need comply only with a state's substantive standards; that is, they cannot be required to obtain a state permit.[119] Furthermore, regulating the discharge of dredge and fill into navigable waters (as that term is defined in the Act and construed by the courts) is the province of the Corps of Engineers; the States may not regulate such discharges.[120] Finally, the Act does not provide standards for the construction of all sewage systems or treatment works. Its standards must be met only as a condition for the obtaining of federal grants by state, municipal, intermunicipal or interstate agencies for the construction of these facilities.[121] Consequently, they would not in any case be applied to private projects such as the oil pipeline.

b. Air Pollution—The applicable federal legislation in this field is the Clean Air Act, as amended.[122] With regard to preemption, it is quite similar to the Federal Water Pollution Control Act. The States are to bear part of the responsibility for the implementation and enforcement of the federal scheme;[123] they may enforce their own regulations unless they are less stringent than the federal ones (except that state regulation of certain moving sources is preempted);[124] and federal facilities must comply with state substantive requirements, but need not apply for and obtain permits from the States.[125]

c. Solid Waste—A new piece of federal solid waste legislation was recently enacted, the Resource Conservation and Recovery Act of 1976.[126] For most kinds of solid waste, the standards established by the Act apply only to those states which have accepted the federal grants made available by the Act for the development and enforcement of state plans.[127] Hazardous waste regulations, though, are applicable to all of the States.[128] Again, however, as in the water and air acts, the States are free to enforce their own regulations as long as they are not less stringent than the federal ones.[129]

The Act departs significantly from the Federal Water Pollution Control Act and the Clean Air Act, however, in requiring federal facilities to comply with both substantive and procedural state requirements, specifically including permit requirements.[130] One commentator has suggested that this might be a harbinger of similar amendments to the water and air acts.[131]

d. Pesticides—The Federal Environmental Pesticide Control Act of 1972[132] is concerned primarily with the registration of sellers of pesticides and the labeling of containers;[133] the classification of pesticides for general or restricted use;[134] and the certification of applicators of restricted use pesticides.[135]

(States may submit plans providing for the performance of the latter function themselves.)[136] If the provisions of the Act are violated, the EPA may issue a "stop sale, use or renewal" order pertaining to the affected pesticide and may in certain situations confiscate it.[137]

The Act clearly delineates the authority of the States. They may regulate the sale or use of any pesticide in the state, but may not permit sales or uses prohibited by the Act;[138] they may not enforce requirements for labeling or packaging in addition to or different than those of the Act;[139] and they may provide for the registration of pesticides to meet special local needs, subject to certain controls.[140]

e. Fish and Game—The States have traditionally regulated the fish and game within their borders. Their power to do so, however, appears to be no greater than their general police power over environmental matters and can be preempted by Congress according to the same rules.[141] Consequently, in determining, for example, whether the Anadromous Fish Act[142] would be applicable to activities on federal lands, such as construction of the pipeline, the same analysis would be used.

This principle can be illustrated by a case decided by Judge Carlson in 1974, *Alaska v. Nelson*.[143] There the issue was whether Alaska's Anadromous Fish Act was preempted by several pieces of federal legislation governing the national forests. The case is analagous to the pipeline lawsuits in at least two ways. First of all, the preemption issue in that case was whether the Anadromous Fish Act was preempted by federal legislation concerning the national forests, not whether it was preempted by the federal statute protecting anadromous fish. Similarly, in the pipeline lawsuits the preemption issue was whether the State's environmental regulations were preempted by the TAP Act and the Mineral Leasing Act, not whether they were preempted by federal environmental legislation such as the Federal Water Pollution Control Act.

Secondly, in the pipeline lawsuits it was assumed, and in *Nelson* Judge Carlson found, that the fact that the activity which the State sought to regulate took place on federal land was not dispositive since, unless preempted, a state's police power extends to most federal lands.

Judge Carlson ultimately held, however, that Alaska's statute was preempted on the ground that it was physically impossible for the defendants, who had contracted to cut timber in the North Tongass National Forest, to comply with both sets of regulations.[144] He said that if they complied with state law, they would be in violation of their contract with the Forest Service; if they fulfilled their contractual obligations, they would be in violation of state law. What was perhaps unusual about Judge Carlson's decision is that he considered not only the federal statutes and regulations, but the provisions of the contract between the defendants and the Forest Service, to be part of the federal scheme with which the state legislation must be in harmony. The Judge did say, however, that the legality of these provisions, that is, whether they were authorized by the federal legislation, was subject to judicial review, perhaps suggesting the possibility that they might not be upheld.

IV. Conclusion

The two major federal-state jurisdictional issues on the pipeline were land ownership and the power of the State to regulate construction on the federal right-of-way. The former concerned the power of the two governments to control their respective lands by issuing their right-of-way and other authorizations and enforcing the terms and stipulations of those authorizations. The latter concerned the power of the State to enforce its environmental statutes and regulations.

Most land ownership issues were resolved in the Cooperative Agreement, although the subsidiary question of title to submerged lands was decided by examining photo maps of the water crossings. The haul road problem was solved by the federal government agreeing to issue the necessary permits to the State, and the State agreeing to enforce stipulations desired by the federal government.

The federal and state governments attempted to resolve the question of the State's power to regulate activities on the federal right-of-way in the Cooperative Agreement. Alyeska, however, not being a party to that Agreement, raised the question itself in at least two lawsuits.

Several things can be learned from those lawsuits. First of all, the fact that land was federally-owned was not dispositive. Secondly, an issue that was *not* presented by pipeline construction was whether the State could regulate federal facilities or activities. Finally, the real issue was whether the State had been preempted from regulating private activities, not by federal environmental statutes, but by two pieces of federal legislation directly related to the construction of the pipeline: the TAP Act and the Mineral Leasing Act of 1920. In the only decision thus far, the court held that the state regulation in question has not been preempted.

Footnotes

1. Meeting with William Moses, Department of the Interior, September 1, 1977; telephone conversation with John McHale, Department of the Interior, September 7, 1977.

2. Cooperative Agreement between United States Department of the Interior and State of Alaska Regarding the Proposed Trans-Alaska Pipeline § IV.2.

3. Trans-Alaska Pipeline Authorization Act § 202(a), 42 U.S.C. § 1651(a).

4. § 202(c), 42 U.S.C. § 1651(c).

4. Moses, *supra* note 1.

6. It might also be noted that, so far as we know, the federal government has neither been a party to, nor filed a brief in, any of the lawsuits arising out of pipeline construction that dealt with the issue of preemption.

7. Right-of-way authorizations over privately-owned lands were the subject of negotiations between Alyska and the private landowners and consequently did not present any federal-state jurisdictional issues. *See, et.*, Cooperative Agreement § I.1.

8. *See, eg.*, Cooperative Agreement § II.1: ". . . /T/he Parties will establish and maintain separate organizations to assure compliance with the terms and stipulations of their respective right-of-way authori-zations . . . ."

9. The haul road did not present the same issues as did the pipeline right-of-way and will be discussed separately *infra*.

10. Although this is an oversimplification, the basic principle is correct.

11. Mineral Leasing Act of 1920, 30 U.S.C. § 185.

12. Alaska Native Claims Settlement Act, 43 U.S C. §§ 1601-1627.

13. Alaska Statehood Law, 48 U.S.C. Prec. § 21.

14. *Wyoming v. United States*, 255 U.S. 489 (1921); *Payne v. New Mexico, 255 U.S. 367 (1921). In place grants are mechanically determined grants over which a state has no control. (To take a totally absurd example, a state may be granted the northeast quarter of each square mile of federal lands in the state.) In lieu grants are opportunities for a state to make its own selection when an in place grant happens to fall within an area which is not in fact available, such as a military reservation. Quantity grants, on the other hand, allow the state, with some qualifications, to itself select its share of lands from all of those in the state that are owned by the federal government.*

15. *Lane v. New Mexico*, 258 Fed. 980, 981 (1919)(*Payne v. New Mexico* in the Supreme Court).

16. *Wyoming v. United States* at 497. Although equitable ownership is a complex concept, the simplest example of an equitable owner is the person whose house is subject to a mortgage. He is the equitable owner; the holder of the mortgage is the legal owner. Each type of owner has certain rights; each is said to have some of the "incidents of ownership"; but neither of them has all of those incidents.

17. Our feeling is that they do nothing to change the status quo.

18. Cooperative Agreement §§ I.1(a) and (f), I.2.

19. Cooperative Agreement §§ I.1(g), I.2.

20. Apparently the primary reason that the interim step of tentative approval was necessary in Alaska was that so much the state was still unsurveyed. It seems, however, that before tentative approval was given, a determination had been made that the land had been properly and lawfully selected. *See*,

et., 43 C.F.R. § 2627.3(d): "Said officer will notify the appropriate State official in writing of his tentative approval of a selection after determining that there is no bar to passing legal title . . . other than the need for the survey of the lands or for the issuance of patent or both."

21. Cooperative Agreement §§ I.1(b), I.2.
22. Cooperative Agreement § I.1(c) and (d), I.3.
23. Cooperative Agreement § I.1(e); 43 U.S.C. § 1610(a)(2).
24. Cooperative Agreement § I.2.
25. Submerged Lands Act, 43 U.S.C. § 1301 *et seq*. This Act, which was made applicable to Alaska by Section 6(e) of the Statehood Act, 48 U.S.C. Prec. § 21, and the "equal footing" doctrine, which provides that "new States . . . have the same rights, sovereignty and jurisdiction . . . as the original States possess within their respective borders," *Mumford v. Wardwell*, 6 Wall. 423, 436 (1867), quoted in *Oregon ex rel. State Land Board v. Corvallis Sand and Gravel Co.*, 7 E.L.R. 20137, 20139 (U.S. 1977), form the basis for Alaska's ownership of lands beneath navigable waters.
26. 43 U.S.C. § 1301(f): "The term 'lands beneath navigable waters' does not include the beds of streams in lands now or heretofore constituting a part of the public lands of the United States if such streams were not meandered in connection with the public survey of such lands under the laws of the United States and if the title to the beds of such streams was lawfully patented or conveyed by the United States or any State to any person."
27. *United States v. State of Alaska*, 423 F.2d 764, 767 (9th Cir. 1970); *United States v. Holt State Bank*, 270 U.S. 49, 55 (1926); *Shively v. Bowlby*, 152 U.S. 1 (1893).
28. *United States v. State of Alaska; United States v. City of Anchorage, State of Alaska*, 437 f.2d 1081 (9th Cir. 1971). In both cases the court inferred from the purpose of the withdrawal that Congress intended to retain the submerged lands. In the first it said that moose could not feed and breed without making use of both the submerged lands and the vegetation that grows on them, and in the second that the terminal facilities could not be constructed without building on the submerged lands.
29. Moses, *supra* note 1.
30. *Utah v. United States*, 403 U.S. 9 (1971); *United States v. Oregon*, 295 U.S. 1 (1934); *United States v. Utah*, 283 U.S. 64 (1931); *United States v. Holt State Bank*, 270 U.S. 49 (1926); *Brewer-Elliott Oil & Gas Co. v. United States*, 260 U.S. 77 (1922). Although this statement does not really answer all of the necessary questions, anything further is beyond the scope of this study. On the issue of navigability in general, and on the question of what issues remain even after it is determined that federal law is controlling, see an article that we have relied on greatly in this portion. MacGrady, "The Navigability Concept in the Civil and Common Law: Historical Development, Current Importance, and Some Doctrines That Don't Hold Water," 3 FLA.S.U.L.REV. 511, 598-604 (1975).
31. MacGrady, *supra* note 30, at 592-593. For a seminal case setting out most parts of this test, *see The Daniel Ball*, 77 U.S. 577 (1870).
32. *Utah v. United States* at 10.
33. *Id.*
34. *Holt State Bank* at 56.
35. *Id.*
36. *Utah v. United States* at 10.
37. *United States v. Utah* at 75.
38. There are three questions that are particularly troublesome. The first is what a body of water's "natural and ordinary condition" is. For one thing, it seems clear that this does not include times of temporary high water, and waters that can only be navigated during those times are not legally "navigable." *Oklahoma v. Texas*, 258 U.S. 574, 587, 591 (1922). Nor does it include "seasons of great drought." *Holt State Bank* at 57. That is, that a body of water cannot be navigated during such exceptional seasons does not destroy navigability. Apparently the phrase means "the ordinary conditions prevailing throughout the greater part of the year", *Oklahoma v. Texas* at 587, and consequently, the Court has implied that a body of water is navigable if it is ordinarily susceptible to navigation for "at least nine months" each year. *United States v. Utah* at 87. Finally, the effect of a body of water being frozen over during the winter is uncertain. One case seems to suggest that periods of ice will not defeat navigability, *United States v. Utah* at 84, while another suggests that they might. *United States v. Oregon* at 23. The Court has apparently not indicated whether a river would be held to be "navigable" even when frozen over, if dog sleds or snowmobiles could be used on it for commercial purposes.

    The second question that frequently arises is what "occasional difficulties in navigation" may exist without destroying navigability. The Court said on one occasion that a river need not be deep enough for the passage of boats in all of its portion. *St. Anthony Falls Water Power Co. v. St. Paul Water Comrs.*, 168 U.S. 349, 359 (1931). Although this was not a title case, it was cited in one (*United States v. Utah* at 77 note 10). It is not clear, however, whether the river was held to be navigable because, although boats could not pass through certain portions, logs could do so over an artificial chute. *St. Anthony Falls* at 359. If this was the reason for the holding, it would be almost completely vitiated since for title purposes it has not been established that the free floating of logs is a "customary mode" of trade or travel, and in any case navigability would be defeated because an artifical improvement had been used. Furthermore, while the Court in one case seemed to find that the necessity of making a few portages would not defeat navigability, *Economy Light & P. Co. v. United States*, 256 U.S. 113, 122 (1921)(again, this was not a title case, but it was cited in one (*Holt State Bank* at 77 note 10)), in another it implied that it would. *United States v. Utah* at 85. Finally, a shallow lake, which was apparently not much more than a swamp, was held to be unnavigable when only a few boats had ever been used on it, for trapping, and the boatmen in those instances either had to get out of their boats occasionally to pull them over shallow areas, or pole them when they got stuck. *United States v. Oregon* at 20-21. The Court found that the lake lacked "that capacity for general and common usefulness for purposes of trade and commerce which is essential to navigability." *United States v. Oregon* at 23.

    The third question is what a "customary mode" of trade or travel is. Small boats, such as canoes, for example, seem to qualify, but what never seems to have been decided is whether the floating of logs, either rafted or free, will do so. *See, eg.*, MacGrady, *supra* note 30, at 593 note 423; *St. Anthony Falls* at 359; *Brewer-Elliott Oil & Gas Co.* at 86.

39. *United States v. Appalachian Electric Power Co.*, 311 U.S. 377, 407-408 (1940).
40. Telephone conversation with Rodger Pegues, Office of the Attorney General of Alaska, September 9, 1977.
41. *Id.*
42. *Id.* The Supreme Court, however, has discussed a similar question, that of shifting sandbars of a type that it called "crossing bars." *United States v. Utah* at 85. It said that where these occur "there is generally more or less difficulty in ascertaining the course of the channel, as the stream may divide into several channels, or it may distribute itself over the full length of the bar so as greatly to lessen the depth of the water from that prevailing in the well-defined channels . . . ." *United States v. Utah* at 85-86. It went on to say that "the mere fact of the presence of such sandbars causing impediments to navigation does not make a river non-navigable," *United States v. Utah* at 86, and that a river may be "navigable in fact, although its navigation may be encompassed with difficulties by reason of natural barriers such as rapids and sandbars." *United States v. Utah* at 86-87. Unfortunately, the Court never said exactly how great an impediment these bars in fact were, which makes it difficult to apply the case to new situations.
43. 43 U.S.C. § 932.
44. *Wilderness Society v. Morton*, 479 F.2d 842, 883 note 94 (D.C. Cir. 1973).
45. *Wilderness Society v. Morton* at 882.
46. *Id.* at note 90. In the case of the haul road, however, the land had been "reserved for public use" by a Public Land Order. Consequently, it was necessary to request that the reservation by revoked or modified, *Id.*, and this was done. *Id.*
47. *United States v. Dunn*, 478 F.2d 443 (9th Cir. 1973).
48. *Dunn* at 444-445 note 2, citing *Central Pac. R. Co. v. Alameda Co.*, 284 U.S. 463 (1932) and *Broder v. Walter Company*, 101 U.S. 274 (1872).
49. Two arguments that were not discussed in *Dunn* are first, that by the plain words of the statute new construction seems to be authorized, and second, that this meaning should be accepted because the statute has frequently been interpreted that way over the years.

    In any case, the issue now seems to be moot. Section 932 was repealed by the Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701 *et seq.*, the Bureau of Land Management's organic act, and a similar provision does not seem to have been enacted in its place. Section 1761(a)(6) of the new Act provides for the granting of right-of-ways for highways and Section 1770(a) provides that such a right-of-way may only be granted under the provisions of the Act. *See also* 1976 U.S. Code Cong. and Adm. News at 6203-6204.

50. 42 U.S.C. § 1652(b).
51. Cooperative Agreement § III.5.
52. Letter of Albert F. Appleton, Friends of the Earth, June 7, 1964.
53. U.S. CONST., art. IV, cl. 2.
54. *McCulloch v. Maryland*, 4 Wheat. 316, 426 (1819).
55. *McCulloch v. Maryland* at 436. Similarly, it has been said that "[t]he activities of the Federal Government are free from regulation by any State." *Hancock v. Train*, 426 U.S. 167, 178 (1976); *Mayo v. United States*, 319 U.S. 441, 445 (1943). As we noted earlier, however, the issue on the pipeline was not state regulation of federal activities, but state regulation of private activities on federal lands.
56. *Northern States Power Co. v. Minnesota*, 447 F.2d 1143, 1145 (8th Cir. 1971).
57. *Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 230 (1947).
58. *Id.*
59. Although this clause confers exclusive "legislation" by its terms, rather than exclusive jurisdiction, the Supreme Court has held that it in fact confers the latter. Engdahl, "State and Federal Power Over Federal Property, "18 ARIZ. L. REV. 283, 288-290 (1976).
60. *Kleppe v. New Mexico*, 426 U.S. 529, 542 note 11 (1976); *Collins v. Yosemite Park Co.*, 304 U.S. 518, 528-530 (1938); Sax, "Helpless Giants: The National Parks and the Regulation of Private Lands," 75 MICH. L. REV. 239, 246 note 41 (1976).
61. *Paul v. United States*, 371 U.S. 245, 265 (1963); *James v. Dravo Contracting Co.*, 302 U.S. 134, 147-148 (1937).
62. *Id.*
63. 48 U.S.C. Prec. § 21.
64. § 11(b)(ii), *Id.* Although the proviso requires that the State's exercise of concurrent jurisdiction be consistent with the laws thereafter enacted by Congress, this would be true in any case because of the Supremacy Clause.

    The third proviso says that Congress shall have exclusive legislation "only so long as the particular tract or parcel of land involved is . . . used for military, naval, Air Force, or Coast Guard purposes." § 11(b)(iii), *Id.* This raises the intriguing question of the effect of the transfer of control of Pet-4 from the Department of the Navy to the Interior Department. In answer to the contention that Congress no longer has exclusive jurisdiction, however, the federal government would probably argue that the land is still "used for military . . . purposes."

65. *Kleppe v. New Mexico* at 543. Apparently, however, under classic Article IV property doctrine the federal government has only the rights of a private proprietor, although there are several qualifications or exceptions: it has full control over the disposition of any interests in its property; it has greater power than a private proprietor in acting to protect its property; a state cannot act so as to impede its governmental functions; and state regulations can be preempted by legislation enacted pursuant to the powers of Congress that were enumerated in the Constitution. Engdahl, *supra* note 59, at 341-342. In this last regard, it is important to note that under this doctrine the Property Clause, though an enumerated power, was apparently "unique . . . in that it was inherently subordinate to state law." Engdahl, *supra* note 59, at 371. That is, legislation passed pursuant to it did not have the same power to preempt state law that, for example, legislation passed pursuant to the Commerce Clause had. The classic doctrine, however, is pretty clearly no longer the law, and probably has not been for at least 30 years. Eng-dahl, *supra* note 59, at 344.
66. *Kleppe v. New Mexico* at 543.
67. Kleppe v. New Mexico at 536.
68. *Kleppe v. New Mexico* at 539.
69. *Kleppe v. New Mexico* at 540-541.

70. It should be noted that a state may cede its jurisdiction with regard to particular Article IV property and states apparently routinely do so for federally owned lands within the National Parks. Sax, *supra* note 60, at 246. The best example of Article IV land in Alaska over which Congress has exclusive jurisdiction is Mt. McKinley National Park.

71. *Omaechevarria v. Idaho*, 246 U.S. 343, 346 (1918). Another qualification would seem to be that an exercise of the police power is invalid if it somehow invades an area reserved to Congress by the Constitution. *See* our discussion *infra*.

72. *State v. Alyeska Pipeline Service Co.*, No. 76-822 CR (Dist. Ct., Third Jud. Dist.)

73. *State v. Alyeska Pipeline Service Co. et al.*, No. 75-899 (Super. Ct., Fourth Jud. Dist., April 2, 1976).

74. *Hancock v. Train* at 178-179.

75. 42 U.S.C. § 1651(a).

76. 42 U.S.C. § 1652(b).

77. 42 U.S.C. § 1652(c).

78. 42 U.S.C. §(d).

79. *Id.*

80. U.S. CONST., art I., § 8, cl. 3: "The Congress shall have power ... [t]o regulate commerce with foreign nations, and among the several States, and with the Indian tribes"; *Hood & Sons v. DuMond*, 336 U.S. 525, 533 (1949); on all of the constitutional issues, *see generally* B. Schwartz, *A Commentary on the Constitution of the United States* (1963).

81. *United States v. Curtiss-Wright Export Corp.*, 299 U.S. 304 (1936).

82. *Hirabayashi v. United States* 320 U.S. 81 (1943); *see gen-erally* U.S. CONST., art. I, § 8.

83. Regarding commerce, *see Southen Pacific Co. v. Arizona*, 325 U.S. 761, 769 (1945); *Cooley v. Board of Port War-dens*, 12 How. 299 (U.S. 1851). Regarding foreign affairs and the national defense, *see* U.S. CONST., art. I, § 10.

84. *See, eg.*, Schwartz, Vol. 1, *supra* note 80, at 234.

85. We have not been able to see the memorandums in a law-suit arising out of construction on the Tolovana River. While we do not believe it to be the case, it is possible that the defendant there argued that the federal Anadromous Fish Act preempted Alaska's Anadromous Fish Act.

86. *Florida Lime and Avocado Growers, Inc. v. Paul*, 373 U.S. 132, 142-143 (1963).

87. *State ex rel. Andrus v. Click*, 554 P.2d 969 (Ida. Sup. Ct. 1976).

88. *Northern States Power Co. v. Minnesota*, 447 F.2d 1143, 1146 (8th Cir. 1971), *aff'd. mem.*, 405 U.S. 1035 (1972).

89. *Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 235-236 (1947); *Northern States* at 1146.

90. 30 U.S.C. § 187. "... None of such provisions shall be in conflict with the laws of the State in which the leased property is situated"; 30 U.S.C. § 189. "... Nothing in this chapter shall be construed to affect the right of the States or other local authority to exercise any rights which they may have. ..."

91. *Texas Oil and Gas Corp. v. Phillips Petroleum Co.*, 277 F.Supp. 366, 368-369 (W.D. Okla. 1967), *aff'd.* 406 F.2d 1303 (10th Cir. 1969), *cert. denied* 396 U.S. 829 (1969).

92. *Northern States* at 1146.

93. *Florida Lime* at 141, quoting from *Hines v. Davidowitz*, 312 U.S. 52, 67 (1941). This is sometimes treated instead as one of the several specific tests. *Northern States* at 1147.

94. *Florida Lime* at 142.

95. *Rice* at 230.

96. *See, generally, Florida Lime* at 144, *Huron Portland Cement Co.*, 362 U.S. 440, 442 (1960); *Northern States* at 1155 (dissenting opinion).

97. *See, eg.*, Section 101(b) of the Federal Water Pollution Control Act, 33 U.S.C. § 1251(b); Section 101(a)(3) of the Clean Air Act, 42 U.S.C. § 1857(a)(3); Section 1002(a)(4) of the Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 1002(a)(4).

98. *Northern States* at 1146.

99. *Rice* at 230.

100. *DeCanas v. Bica*, 424 U.S. 351, 359-360 (1976).

101. *New York Dept. of Social Services v. Dublino*, 413 U.S. 405, 421 (1973).

102. *Id.*

103. *See* Federal Agreement and Grant of Right-of-Way § 4.B; State Right-of Way Lease § 40.b.(i).

104. *Florida Lime* at 143-144. This will occasionally be found even though it would not seem that Congress consciously had such an intention.

105. *Rice* at 230.

106. *Kelly v. Washington*, 302 U.S. 1, 10 (1937).

107. § 202, 42 U.S.C. § 1651(a).

108. *See* text accompanying notes 75-79.

109. *See* text accompanying note 104.

110. *See* text accompanying note 105.

111. See text accompanying note 93. The Supreme Court has found, although in a different context, that state regulation is capable of presenting an insurmountable obstacle to the accomplishment of federal objectives. In a case involving the regulation of federal facilities, the Court warned that allowing a state to enforce its permit requirements in effect gives it the power to completedly halt the regulated operation. *Hancock v. Train* at 180.

112. It might be worth reemphasizing here the Court's reluctance to find that state environmental regulations have been preempted, because of the strong tradition of state and local control of pollution and Congress's frequent declarations that the state and local governments have the primary responsibility for controlling pollution.

113. Federal Water Pollution Control Act, as amended, 33 U.S.C. §§ 1251-1376.

114. §§ 301(a), 502 (12)(A), 33 U.S.C. §§ 1311(a), 1362(12)(A).

115. § 502(7), 33 U.S.C. § 1362(7).

116. *United States v. Holland*, 373 F. Supp. 665 (M.D. Fla. 1974).

117. *See, eg.*, § 402(b), 33 U.S.C. § 1342(b).

118. § 510, 33 U.S.C. § 1370.

119. *EPA v. State Water Resources Board*, 426 U.S. 200 (1976).

120. § 404, 33 U.S.C. § 1344; *Minnesota v. Hoffmann*, 7 E.L.R. 20066 (8th Cir. 1976).

121. See generally §§ 201-212, 33 U.S.C. §§ 1281-1292.

122. Clean Air Act, as amended, 42 U.S.C. §§ 1857-1858a.

123. § 110, 42 U.S.C. § 1857c-5(a)(1).

124. § 116, 42 U.S.C. § 1857d-1.

125. § 118, 42 U.S.C. § 1857f; *Hancock v. Train*.

126. Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901-6987.

127. §§ 4001-4009, 42 U.S.C. §§ 6941-6949.

128. §§ 3001-3011, 42 U.S.C. §§ 6921-6931.

129. § 3009, 42 U.S.C. § 6929.

130. § 6001, 42 U.S.C. § 6961.

131. Watson, "State Control of Federal Pollution: Taking the Stick Away from the States," 6 ECOL. L.Q. 429, 446 note 87 (1977).

132. Federal Environmental Pesticide Control Act of 1972, 7 U.S.C. §§ 136-136y.

133. 7 U.S.C. § 136a.

134. 7 U.S.C. § 136a(d).

135. 7 U.S.C. § 136b.

136. 7 U.S.C. § 136b(a)(2).

137. 7 U.S.C. § 136k.

138. 7 U.S.C. § 136v(a).

139. 7 U.S.C. § 136v(b).

140. 7 U.S.C. § 136v(c).

141. *See, eg., Kleppe v. New Mexico* at 545-546; *Toomer v. Wit-sell*, 344 U.S. 385, 401 (1948).

142. AS 16.05.840-.900; AS 16.10.010-.050.

143. *Alaska v. Nelson*, No. 74-42 CR (Super. Ct., First Jud. Dist., 1974).

144. *See* text accompanying notes 86-87.

Appendix C

Chapman and Sheep Creeks Crossing Histories

Chapman Creek, Alignment Sheet 96, Pipeline Station 295+17

A description of this creek and summary of government monitoring actions at the crossing there appears in Chapter VII. The following is a detailed chronology of those actions, drawn from field and office records of APO and JFWAT and is included as an illustration of the kinds of field records used in preparing the Chapman Creek and other crossing histories summarized in Chapter VII.

•February 28 1975 — JFWAT Advisory Memo #1505 — Julius Rockwell, JFWAT. "Non-Conformance" AS 96, Sta. 295+17.

Discussion of action: "Technical violation of AS 16; workpad put across stream with culvert but without permit. Culvert was passing water and no immediate problem but culvert should be replaced with approved design within 30 days. This is the 4th fish stream crossed without a permit of 4th inspected. Recommend a QA report."

Action taken by AOFR: "Not write F.M. without hyd. permit if necessary." 3/2/75 Jack McCoy.

•March 28-April 2, 1975 — Narrative Surveillance Report — Keith Morehouse, JFWAT.

"Advisory Memo No. 956 to J. McCoy dated 4/1/75. Response to FDCM No. CF-12, Location A/S 96, Sta. 295+50. A four-part plan was requested which would utilize temporary culverts in lieu of the permanent design structure. Culverts would be removed prior to stream/fish critical periods. Advisory memo stated that it appeared to be an excellent plan and was approved as outlined. Recommended fill materials silt free, or essentially so, and effectively, cleaned out of channels when culverts are removed. Fish stream."

•April 1, 1975 — JFWAT Advisory Memo #956 — Keith Morehouse, JFWAT. "Notice to Proceed" "Permit Action" — AS 96 Sta. 295+17/Sta. 415+50.

"Appears to be an excellent decision — approved as given. Materials used for fill should be silt free or essentially so, and effectively cleaned out of channels when culverts are removed. Fish stream channels (response to ADCM #CF-12)."

•April 7, 1975 — Field Memo, ref. FDCM CF-12 — Herbert Kittler, AS 96, 295+17 — Chapman Creek. "Notice to Proceed."

"Authority to install temp. 24" CMP is granted according to provisions outlined in subject design change. Tem. CMP installation for VSM installation will be coordinated with AOFR as advised by JFWAT personnel."

•July 19, 1975 — JFWAT Advisory Memo #1076 — Dennis Ward, JFWAT. "Non-Conformance" — AS 96, 295+17, Chapman Creek.

"This stream has been blocked with sand bags to raise water level for pumping. Barrier is impassable to fish up or downstream. Remove this immediately or before 12:00 noon July 20, 1975. Violation of Stip. 2.5.1.1 — fish passage."

Action taken by AOFR: "Contractor notified through Alyeska staff — bags removed."

•September 22, 1975 — JFWAT Advisory Memo #1650 — Robert Hallock, JFWAT. "Other" — AS 95, Sta. 295+17 fish stream.

"The temporary CMP was insufficient to meet the discharge during recent rains. As a consequence, it failed. JFWAT recommends that a larger (60" CMP) be used if a temporary structure is still necessary. Access roads exist on each side of this stream. Stips. 2.4.3.1, 2.7.2.5."

Action taken by AOFR: "Larger CMP — 60" installed." Jack McCoy. August 23, 1976.

•February 20, 1976 — JFWAT Advisory Memo #1979 — Robert Hallock, JFWAT. "Other."

"The following are priority 1 (before breakup) items from the Section IV JFWAT Pipeline punch list." includes: "AS 96, 295+17."

•May 18-26, 1976 — Narrative Surveillance Report — Lewis Pamplin, JFWAT.

"Similar problems to those which existed at Little Nasty have occurred at two fish streams in A/S 96, Sta. 295+17 and 417+80. The AOFRs have indicated to Alyeska field personnel that corrective actions, similar to those recently taken at the Little Nasty, should be initiated immediately at the above referenced streams."

•May 22, 1976 — JFWAT Advisory Memo #1795 — Lew Pamplin, JFWAT. "Non-Conformance" — AS 96 Sta. 295+17.

"Due to the inadequate drainage structure installation in the workpad (1(?) 36" CMP) at above referenced fish stream (HR has a multiplate) and resulting winter aufeising and spring melt, the workpad is eroding and the natural stream channel is blocked with ice. This is very similar to the problem at Little Nasty. Request, that APSC be required to immediately remove the existing culvert and overexcavate 2' below CMP to restore stream channel and alleviate pad erosion. Recommend a bridge or large multiplate be reinstalled prior to any equipment crossing this fish stream after runoff and restoration."

Action taken by AOFR. "Told Aly to open this up and make a work X-ing."

Note on back: "Closed. Fish passage provided when restrictive bridge was removed week of 10/10/76. Pad now closed."—Carl Burger, JFWAT 4+5.

•May 24, 1976 — daily log — Jack McCoy, AOFR.

"Had a JFWAT concerns meeting . . . work pad concerns . . .

"3 Aufeis/stream crossing structures needed at A/S 96 Sta. 417 & 295+17. Will be done."

•May 25 — June 2, 1976 — Narrative Surveillance Report — Robert Hallock, JFWAT.

"A bridge was installed at Sta. 295+17 and 417+25 in A/S 96. The temporary culverts at these stations were removed to prevent additional pad washouts this year. The channels are to be restored this summer."

•June 3, 1976 — daily log — Jack McCoy, AOFR.

"Both stream crossings, A/S 96, Sta. 295 & 425 are now bridged and riprapped by structures which have already passed the bending machine, the heaviest piece of equipment."

•August 16, 1976 — JFWAT Advisory Memo Record, ref. A.M. #1505 — Herb Kittler, JFWAT. A/S 96, Sta. 295+17.

Problem: "Protocol."

Action requested by AOFR; "Oral approval given by AOFR previously."

Action taken by permittee: "Culvert installation completed; culvert installation requested, required; and this requires working in stream."

•August 22, 1976 — JFWAT Advisory Memo Record, ref. A.M. #956 — Jack McCoy, AOFR.

"Action taken as per FDCM CF-R."

•August 23, 1976 — JFWAT Advisory Memo #2343 — Robert Hallock, JFWAT. "Non-Conformance" "Permit Action" — AS 90 Sta. 1339700/AS 96 Sta. 295+17.

"Channel restoration work should be completed at the above stations before freezing conditions are encountered this fall. These problem areas have been pending since 6 Feb. 1975. They could not be completed this spring because of frozen soils.

"Glaciering, vegetative changes and fish passage problems are anticipated if this work is not completed now."

Action taken by AOFR: "Sympathized with JFWAT. Will emphasize greensheet directed completion."

Note on back: "Work completed by 10/76 — Closed." CB

•August 25, 1976 — Field Memorandum #4023 — Jack McCoy, AOFR. "NTP" "Request for Service" — AS 90 and 96 fish streams.

"You are authorized and requested to remove the temporary crossings and restore original thalweg elevation at A/S 90 Sta. 1339+00 and A/S 96 Sta. 295+17 and 417+25. These streams had serious aufeis accumulations in 1975-76 and will be a continuing maintenance and fish passage problem. Work shall be as directed on approved 'greensheets' prepared by Alyeska's restoration engineer. This work shall be scheduled for accomplishment *after* the hydrotest and insulation activities. The stipulations, Alyeska specs. ECPM and conditions of NTP 4RC-2 (Rev. 1-5) govern."

•August 31-September 7, 1976 — Narrative Surveillance Report — Robert Hallock, JFWAT.

"APSC indicates they will correct the drainage structure deficiencies at Sta. 1339+00, A/S 90, the Little Nasty Creek, Sta. 5708+00, A/S 87, Sta. 295+17 and 417+25, A/S 96 and Sta. 932+40, A/S 89, before freezing conditions prohibit work."

•September 14, 1976 — note from Carl Burger to Jack McCoy on prefreezeup rehab priorities in Sec. IV includes:

". . . A/S 96 rehab. of channels from Sta. 295+17, (FM 4023) to 417+25, CMP removal on A/S 89, Sta. 932+10 . . ." (Bridge—G.S. 76-487)

•March 16, 1977 — Environmental Spot Check Report #19-822 — Robert R. Gleason, EEI. AS 96, Sta. 295+17.

"Work pad snow clearing. The work pad was being cleared at the above-ground sections of pipe so that workers could get in to make adjustments on the pipe support, insulate valves and insulate VSMs. Clearing was typically done by bulldozer because of the 3 ft. of snow, the track was one lane wide with occasional turn-arounds cleared. Snow was left on the work pad 2 to 6 inches deep so that the dormant seeding will not be affected. The clearing stopped well short of 295 creek. This effort should do minimal damage to the dormant seeded work pad and no damage to water diversion ditches."

Summary recommendation: "Work pad snow clearing was one lane wide, leaving a 2 to 6 inch pad to protect dormant seeding and the clearing stopped short of 295 Cr AS 96."

AOFR-Permittee's action to date: "Acceptable." Jack McCoy. AOFR comment: "This report does not substantiate wanton destruction of cross-drain levees."

•March 22-23, 1977 — Narrative Surveillance Report — Charles Kay.

"Chapman Creek Sta. 295+17 A/S 96 North Fork of Windy Arm Creek Sta. 417+25 A/S 96.

"At Chapman Creek and the North Fork of Windy Arm Creek, JFWAT observed that vehicles had driven around or over the berms at these two block points and across the aufeised creeks; stipulations similar to that observed at French Creek Zero.

"JFWAT NCR Adv. Memos #3269 and 3270 were directed to AOFR Kittler and AOFR Kittler stated, 'No environmental damage is noted. Permittee will be directed to place barricades prior to spring runoff.' "

•March 30, 1977 — JFWAT Advisory Memo #3269 — Charles Kay, JFWAT. "Non-Conformance" AS 96, Sta. 295+17.

"Ref. stips 2.2.1.1, 2.2.2.2, 2.4.1.1, 2.4.1.2, 3.9.1, and attached poloroid photo. APSC has been driving across Chapman Creek. This area was __________, graded, seeded, and fertilized last fall and is listed as a block point. Now that a track has been established, others will utilize this unauthorized crossing, thereby increasing the probability of environmental and fisheries damage. JFWAT requests that APSC be ordered to stop driving across Chapman Creek and that APSC physically block the ROW on both sides of the creek to prevent all vehicle access."

Action taken by AOFR: "No environmental damage is noted. Permittee will be directed to place barricades prior to spring run-off." Herbert Kittler.

•April 19-25, 1977 — Narrative Surveillance Report — Robert Hallock, JFWAT.

"Equipment has been operating in the following fish streams this spring without authorization: Caribou Mt. Cr. Sta. 56+03 AS 96, and Jackson's Slough Sts. 556+00 AS 97. These were all previously designated block points and they do not have drainage structures. All had natural or reestablished banks and more positive blocking structures have been recommended."

•May 3, 1977 — Environmental Check Report #19-823 — Robert Gleason, EEI. AS 96, Sta. 295+18.

"Berms to be placed at both sides of stream block points AS 96, Sta. 195+18, and Sta. 417+61. These were a special request by JFWAT to Alyeska. Berms had been put up last year but the special 3 ft. high berms and signs were *not* done yet."

Summary Recommendation: "The berms for AS 96, Sta. 295+17 and 417+61 had not been done as requested by JFWAT."

•May 10-18, 1977 — Narrative Surveillance Report — Lewis Pamplin/Lou Swenson, JFWAT.

"Chapman Creek, AS 96, 295+17, HR 205+23. WCR #3315. Haul road culvert is completely under water creating a velocity barrier to fish migrating upstream. JFWAT recommends immediate steaming of culvert with subsequent installation of adequate drainage structures this summer. Also restoration of work pad washouts upstream of haul road must be accomplished."

•May 16, 1977 — Environmental Check Report — #27-824, EEI. AS 96, Sta. 295+17.

"Berms set on 295+417 creeks AS 96. Berms had been pushed up at both creeks to stop traffic from crossing the streams during the winter. Two-Ninety-Five Creek had a 3x10x20 ft. eroded area on the north side where water had bypassed the ice in the creek. Flow had subsequently restored to its normal channel by eroding the ice.

"In 417 creek there was a 1'x3' erosion channel across the work pad where the stream had bypassed the stream ice. Currently, the water was flowing under the ice."

Summary recommendation: "Berms were up on 295 + 417 creeks. There was some erosion caused by initial flows bypassing the stream ice. Erosion had stopped by 5/14/77."

AOFR — Permittee's Action to Date: "Acceptable" — Jack McCoy. AOFR comment: "If we leave well enough alone, the fish will be happy. All traffic is blocked."

•May 17, 1977 — AT Advisory Memo #3315 — Lew Pamplin and Lou Swenson, JFWAT. "NCR" AS 96, Sta. 295+17 (HR 205+23) Chapman Creek.

"Ref stips 1.18.1, 2.4.1.2, 2.5.1.1, 2.8.1. Inadequate drainage control at above haul road location (structure too small, ice blocks) is causing velocity barrier which blocks upstream fish migration and will result in unnecessary long-term erosion of haul road. In addition, WP material from previous years' washouts at above ref. pipeline sta. is present and areas unrestored. JFWAT recommends immediate action to steam open HR CMP and subsequent work this summer to include additional drainage installation and restoration."

Action taken by AOFR: "Need bigger culvert at HR."

Sheep Creek, Alignment Sheet 102, Station 933 + 01

A description of this creek and summary of government monitoring actions at the crossing there appears in Chapter VII. The following is a detailed chronology of those actions, drawn from field and office records of APO and JFWAT, and is included as an illustration of the kinds of field records used in preparing the Sheep Creek and other crossing histories summarized in Chapter VII.

•December 10, 1974 — daily log — Schroeder, AOFR.

"South with Pamplin and Metsker to look at stream X-ings in attempt to resolve issue of 100 foot buffer required on NTP. Received permission to clear and construct pad to (garbled) and nearest each bank of stream. At Sheep Creek ... contractor unaware of buffers and JFWAT's requirement for X land before clearing can proceed. Foreman outlined plan to shoofly wherever possible at small streams, rather than cross. ... Metsker and Pamplin indicated September through November was probably the best time to cross, unofficially."

•May 23, 1975 — JFWAT Advisory Memo #1563 — Lou Pamplin, JFWAT. "Permit Action."

"Reference Alaska Statute 16, Federal Stipulations 2.4.1.3, 2.5.1.1, and 2.7.2.5; there is no objection to the installation of the below listed drainage structures and/or work pad construction at the following fish streams (see attached sheet). Final ADF&G approval (Anchorage) will follow." Includes Sheep Creek, AS 933+01. Drainage structures: "48" CMP with letdown structure and still in basin." Remarks: " 'Neck down' pad at stream crossing and provide downstream siltation control measures."

Note: "The above structures and/or construction methods were resolved by field inspection on 5/22/75 with ..." (four names, not legible).

Action taken by F.R. Schroeder: "FM issued." APSC in agreement.

•May 24, 1975 — APO Field Memo #2906 — Schroeder, AOFR. "Other."

"Crossings as proposed in your memo 23 May 75 and JFWAT memo 23 May 75 are acceptable and construction may proceed. Among the streams listed, Sheep Creek, Station 933+01 — two 48" CMP with basin."

•June 9, 1975 — daily log — AOFR.

"AS 102 — fish streams — Sheep Creek. Request for rehabilitation of stream in attempt to re-establish fish habitat."

•June 9, 1975 — APO Field Memo #1432 — F. Schroeder. "Other."

"Sheep Creek station 933+01. In reviewing this site 8 June 75 I am convinced that minimal effort would re-establish several miles of excellent fish stream habitat. For this reason I am superseding reference memo above (FM 2906 dated 24 May 75) and requesting that the basin as previously agreed to be negated. The culverts may be placed and pad construction proceed provided a uniform gradient be established between the haul road culvert (outlet) and the pad culverts (outlet). The pad culvert should then be placed to accommodate construction of short segments of channel between the road and the pad and fish passage criteria be utilized re: gradient. Additional work on this action may include a rock filled channel upstream from the pad and a small amount of work upstream from the haul road. This work will mitigate damage previously caused by the winter trail."

•June 9, 1975 — JFWAT Advisory Memo #1583. L. Pamplin, JFWAT. "Other."

"As a result of our field review and discussions on potential impact and possible mitigative measures I concur with your recommendations that the proposed culverts be installed without letdown structures and an attempt be made to establish grade to haul road culverts which will facilitate fish movements. This can possibly be accomplished by a system of pools and riffles in the excavated channel." Action taken by AOFR Schroeder: "FM issued requesting study by APSC and culvert placed accordingly."

Advisory memo record to AM 1583.
Problem: "Creek damage by old winter train and haul road culvert midstream channel at downstream side."
Action requested by AOFR: (Field Memo) "Based upon reanalysis with Pamplin, JFWAT, I recommended we try to salvage the stream for fish passage."
Action proposed/taken by Permittee: "2 60" CMP's installed—situation confused by change in personnel thus unsatisfactory job resulted. This was AOFR/JFWAT fault more than APSC. In 1976 CMP's tore out and LWC installed. This LWC washed out due to steep grading of creek. (See AOFR memo on file regarding our attempt to force low gradient.) Recommendations now are to let the stream seek its own gradient with some rock work for pooling." Schroeder, August 25, 1976.

•June 15, 1975 — daily log — AOFR.

"Twin culvert installation at Sheep Creek crossing started — many problems connected with installation."

•June 21-25, 1975 — Narrative Surveillance Report — Julius Rockwell.

"There was a list of required actions when I arrived and, unfortunately, a larger list when I left, as follows: ... perched culvert on Sheep Creek (3 HR 2018+85 (AS 102)) needs attention. Check to see if corrected."

•June 24-July 2, 1975 — Narrative Surveillance Report — Burger, JFWAT.

"Another problem area requiring followup is a block to fish passage created by perched work pad culvert and last year's haul road construction at Sheep Creek (AS 102)."

•June 29, 1975 — JFWAT Advisory Memo #1045 — Carl Burger, JFWAT. "Non-Conformance."

"Installation of work pad culverts at Sheep Creek has not provided for fish passage (stip. 2.5.1.1) in that the outlet flows are perched some four feet above stream's water level. Attempt has not been made to establish grade to HR culverts, as requested on 6/9 (JFWAT Memo #1583). The JFWAT requests that permittee submit plan for fish passage ASAP. Suggest that clean, mixed gravels and series of pools be considered to establish grade not exceeding 3 percent. Additionally, outlet of HR culverts is directing flows over vegetation and weir exists at original stream banks. This second block to fish passage must be corrected."

Action taken by AOFR Sahr: "A plan for resting pools up and downstream has been submitted by L. Pamplin."

Advisory Memo Record for AM 1045.
Action requested by AOFR: "By installing LWC or lowering CMP."
Action proposed/taken by Permittee: "LWC Installed March 76, reference also Memo 2508 wherein JFWAT has removed Sheep Creek from non-conformance status and requests study. I concur." Schroeder, August 11, 1976.

On back of the Advisory Memo is written, "Plan submitted and implemented. Fish passage appears to be provided. Closed as of 10/76." Burger.

Advisory Memo Record for AM 1045. (second one)
Action Requested: "Reevaluate crossing to replace culvert properly, co-install LWC so as to provide proper stream velocity."
Action proposed/taken by Permittee: "Proposed to remove culvert and rework up and downstream of crossing to allow for desired velocities — this did not occur. Unfortunately until the Spring of 76. This is not particularly a fish stream — that is a couple fish have been observed between the Haul Road and work pad." Sahr, August 21, 1976.

•July 4, 1975 — daily log — AOFR.

"Sheep Creek claimed by miner Vern Miller. Outcome will affect requirements for work pad culverts."

•August 17, 1975 — JFWAT Advisory Memo #1758. Lou Pamplin, JFWAT. "Non-Conformance."

"At present there are several constructed areas, scattered throughout the above referenced alignment sheets, which have not received adequate attention by APSC as relates to minimizing impact to fish and wildlife resources. The attached sheets designate."

Action taken by AOFR: "To communicate to APSC for action."

Attached sheets include in part:

"(6) AS 102. Station 933+01 (Sheep Creek). Stipulation violation: 2.5.1.1. Past correspondence: JFWAT AM #1583 dated 6/9/75; 1045 dated 6/29/75. Action required: 'Fish passage be provided; present structure is totally unacceptable.' Completion time; prior to freezeup 1975."

Advisory Memo Record for AM 1758.
Action requested: "Forwarded list and comments to APSC for action."

Action taken by Permittee: "Action or lack of action to have been field check to assure compliance." Sahr, August 21, 1976.

•September 3-11, 1975 — Narrative Surveillance Report — Burger, JFWAT.

"A list of fish and wildlife concerns on Section V were generated this week outlining 13 pipeline and haul road problems (see Advisory Memo #1745, attached). A particular concern on this list are Sheep Creek, AS 102, PL 933+01; Hr 2018+85 ... Following three months of verbal and written requests to provide for fish passage at the work pad and haul road crossings at Sheep Creek, there has been no response from APSC except for promises planned to correct the situation."

•September 9, 1977 — JFWAT Advisory Memo #1745 — Carl Burger, JFWAT. "Non-conformance" "Other."

"Reference JFWAT Memo #1758 (8/17/75). Enclosed list of concerns and requests for action supplement those in memo referenced above. Pipeline and *haul road concerns* are listed herein, to which APSC has not given adequate attention in regard to stip. compliance in minimizing fish and wildlife impacts. Work must be completed as per enclosures."
Action taken by AOFR Schroeder: "Will transfer modified list to APSC for punchlist action on pad refurbishment."

Alignment Sheet 102. Station PL 933+01 HR 2018+85 (Sheep Creek). Stipulations: 2.5.1.1 (Non-conformance). Concern: "Reference JFWAT Memos 1583 (6/9/75) and 1045 (6/29/75). A summer of fish passage has been blocked due to destruction at winter trail crossing, work pad culverts and haul road culverts. Three months have elapsed without correction by Permittee."
Action required: "Provide fish passage at work pad crossing *and* haul road crossing. Road culvert was not skewed according to plan. Channel work is necessary downstream *and upstream* of haul road culvert. Work must be completed before freezeup."

•September 9, 1975 — daily log — AOFR. Refers to: JFWAT Advisory Memo #1745, Undated notes on list of concerns in AOFR log. Includes AS102 Station 933+01. "OK."

Advisory Memo Record for AM 1745.
Subject: "All road culvert erosion AS 102."
Problem: "See 1038, 1744, 1898, 2508."
Action Requested: "Plan submittal."
Action taken: "August 76 fix up. Reference Memo AOFR to AOR 27 July 76." Schroeder, August 11, 1976.

•September 10-17, 1975 — Narrative Surveillance Report — Morehouse, JFWAT.

"No action appears to be forthcoming before freezeup on the Sheep Creek (AS 102, Station 933+01) problems which were identified early last summer. But the appropriate pressures quickly brought to bear. The pad culvert is still perched and no channel provisions have been made between the HR and work pad. Spring will again find a no fish passage situation at this location if steps are not taken at this time to provide suitable accommodation which will allow fish passage to above the HR. The work pad culvert may require being reset or pulled out altogether."

•September 24, 1975 — JFWAT Advisory Memo #1853 — Carl Burger, JFWAT. "Non-conformance." "High priority concerns."

"Reference stips. 2.5.1.1, 2.8.1, 2.5.2.4, 2.4.3.1 and JFWAT memos 1583, 1045, 1745, 1722, 963, 1743 and 1748. Despite continuous requests for plans and rehab from APSC, existing fish passage blocks and erosion potentials have not been addressed in the following areas:

Sheep Creek, AS 102: PL 933+01. Unnamed.

"Please consult the above references, JFWAT punchlist and Ken Durley's (APSC) [*Alyeska field biologist*] assessment of concerns. Work *must* be done before freezeup, as frozen ground will hinder efforts otherwise. Also, please advise permittee that they are not in conformance with Alaska Title 16.05.870."
Action taken by AOFR Sahr: "Request action by APSC."

Advisory Memo Record for AM 1853, dated 9/24/75. Location: 1 — Sheep Creek; 2 — Union Creek; 3 — Nutirwik Creek; 4 — N/A.

Arrow to Sheep Creek says, "See FM 2508—Burger JFWAT classes this as no longer NC condition. Requests reevaluation, also 1045."
Problem: "Fish blockage at 1 and 2, stream regrading at 3, culvert installation at 4."
Action Requested by AOFR: "Because of delays and more pressing concerns, as well as disagreement on item 3, APSC requested and was granted by AOFR relief on doing items 1, 2, and 3 until Spring 1976. No environmental damage could be cited, thus schedule was not critical. Item 4 was requested."
Action Proposed/Taken by Permittee: "1. Rehab. was attempted March 76, but failed. JFWAT has demanded more than APSC can supply at this location, that being a gradient less than the original stream, thus guaranteeing fish passage. AV analysis is necessary."

•September 26, 1975 — daily log — Sahr, AOFR.

"Note plan from APSC as to Sheep Creek rehab. — Metzker develop plan — gave to Jacobson for work."

•September 24-30, 1975 — Narrative Surveillance Report — Howard Metzker.

"Advisory memo #527 was submitted to the AOFR pointing out considerations and providing fish passage through the CMP on Sheep Creek, AS 102, Station 933+01. See attachment."

•September 26, 1975—JFWAT Advisory Memo #527. "Other."

"Points to be considered for fish passage of Sheep Creek are attached. ...

1. Work for fish passage is required before October 1, 1975.
2. Stream channel between haul road and work pad needs to be reconstructed. An approximate 2' vertical drop exists in present channel which is considered to be a fish block. Should be corrected before stream bed is frozen.
3. Upper end of right bank culvert needs to be cleared of (garbled) bank gravel material. Culvert is completely blocked.
4. Downstream culvert outfall needs to be graded downstream with a series of pools, none of which should be over 4-6 drop height, to the present stream grade, 30-40 feet downstream. A (garbled) stream bank will be required the entire length, plus an extended distance downstream 10-20 feet. Pools to be constructed should be stream width and 3-4 feet in length.
5. The work upon completion must satisfy both the AOFR and JFWAT before acceptance is given."
6. Spring maintenance is required."

Action taken by AOFR Sahr: "Plan to be given to APSC for work — may be a legal implication due to mining claims."

•October 5, 1975 — daily log - Schroeder, AOFR.

"Plan for Sheep Creek rehabilitation received. Holding for JFWAT review."

•October 6, 1975 — daily log — Schroeder, AOFR.

"Looked at Sheep Creek and submitted my version of what should be accomplished (FM 1645). No JFWAT here, but their input in hand from previous tour. Will be essentially a compromise between two extremes, and better than either."

•October 7, 1975 — daily log — Schroeder, AOFR.

"FM 1648 issued authorizing work at Sheep Creek then taken back when APSC engineers couldn't agree on design. Will await decision."

•October 7, 1975 — APO Field Memo #1648 — Schroeder, AOFR.

"Your proposal to construct a five foot LWC (insulated) is acceptable. Attached are sketches of the original stream configuration followed by a generalized alignment which approximates the original. The gradient is steep in the stream, thus any coverture and rootwrapping which slow the water and reduce its gradiant is desirable. ... If your engineers agree with this plan, you are authorized to initiate work when equipment is available. ..."

Reference drawings apparently misattached to FM 1646, dated October 6 and located in the file. FM 1645 which log indicates Schroeder's version of Sheep Creek not in file.

•October 7, 1975 — Narrative Surveillance Report — Carl Burger, JFWAT.

"After four months of frustrating requests and several nonconformances, Sheep Creek (AS 102:933+01) was staked for active action by J. Cushing APSC. Cushing believes that the streambed below two perched CMP's and the work pad can be built up with pools and select fill. Ditching upstream of the work pad will also tend to rectify fish passage problems below the haul road culvert. Despite the effort to attempt to build up the streambed below the work pad, however, memo #1864 (attached) points out that culvert removal and low water crossing installation may be more suitable and less costly in the long run."

•October 14, 1975 — JFWAT Advisory Memo #1864. "Permit Action" Other."

"Reference stips. 2.5.1.1, 2.4.3.1 and Alaska Title 16.05.870. This memo authorizes construction as Sheep Creek for the purpose of providing fish passage. APSC has promised to complete work by freezeup, this year. On 10/12/75 I observed the staking of this creek by J. Cushing (APSC). Under his plan CMP's would remain and bed will be elevated with select fill and pools below inlet. Excavation upstream will tie channel to HR CMP's. Recalled that APSC has been advised by AOFR Schroeder and myself that a LWC may be more suitable for fish passage and less costly in the long run. If present plan fails, a LWC will be requested. In my mind, the best solution is to pull CMP's to natural grade and close access across Sheep Creek, *after pipe installation*, and let maintenance equipment access by north and south existing roads. Final hydrologic authorization (Anchorage) will follow." No indicated action by AOFR.

•October 15, 1975 — Field Memo #1655. "Other."

"This FM supersedes FM 1648 7 October 75: Authorization granted to construct the crossing as proposed in Cushing drawing, dated 12 October 75. The riprap in column one as shown in AOFR drawing issued under FM 1648 is still suggested, especially in the area between Haul Road and Pad. Copy of JFWAT Memo 1864 is attached for your information. Because of the general difference of opinion as to the design of this crossing, the final acceptance will be based upon performance. Construction is left to your option regarding culvert or LWC."

•October 19, 1975 — daily log — AOFR.

"Per Cushing APSC Sheep Creek to be LWC per FM 1648. ... LWC to be installed at Sheep Creek."

•October 15-22, 1975 — Narrative Surveillance Report — Morehouse, JFWAT.

"Spoke to the AOFR about the problem of getting action on long-standing concerns of Sheep Creek (933+01) and the AS 100 fish stream loss. The Sheep Creek situation is that there has not been fish passage over the last season due to perched culvert, etc. We have been promised action, but none has been forthcoming. The latest plan is removal of the culvert (best plan yet) and installation of an LWC. It remains to be seen if spring brings fish passage on Sheep Creek."

•October 21-28, 1975 — Narrative Surveillance Report — Carl Burger, JFWAT.

"Despite an apparent satisfactory plan for fish passage at Sheep Creek (AS 102) in early October, it is now evident that work will not commence until just prior to breakup. This is not in conformance with APSC promises that work would be completed by freezeup. However, contractors are presently attempting to restore fish passage at another high priority area: AS 100 (523+33) ... Areas in Section V requiring further action include ... several high priority items (to be complete by breakup) such as fish passage at Sheep Creek (AS 102) ..."

•November 1, 1975 — daily log — Schroeder, AOFR.

"Discussed Sheep Creek with Simmons, Arctic, and gave copy of FM 1648 with attachments."

•February 24-March 3, 1976 — Narrative Surveillance Report — Carl Burger, JFWAT.

"Jack Cushing (APSC Arctic Engineer) submitted a lengthy prebreakup restoration list. JFWAT's rehabilitation concerns were included (Sheep Creek, AS 100 Fish Stream, etc.). R. Simmons, Arctic, promised completion of JFWAT priority concerns by breakup. AOFR's support JFWAT's request."

•March 6, 1976 — daily log — Schroeder, AOFR.

"Discussion Cushing, APSC, on Sheep Creek. Need for work before A/G instruction."

•March 7, 1976 — daily log — AOFR.

"FM 2239 Sheep Creek Advisory AS 102."

•March 7, 1976 — APO Field Memo #2239 — Schroeder, AOFR. "Other."

"Sheep Creek has been an issue since June 75 when the existing drainage structure was installed. In agreements between AOFR/JFWAT and APSC, this crossing is to be modified before break-up. Modification will require complete access in the area between the A/G pipe and the Haul Road. This memo is to alert you well in advance that pipe replacement across this section will not be allowed before the modifications have been completed and accepted. The commitment to complete this work prior to freeze-up previously made by APSC was delayed by AOFR at APSC request and to the dismay of JFWAT representatives. The commitment then made by APSC to AOFR is considered binding. Please initiate appropriate instructions accordingly. Attachments: All previous FM on the subject."

•March 21, 1976 — daily log — AOFR.

Discussion/instructions with Squires. Re: work at ... Also again requested/suggested they get on Sheep Creek ... "will seek Cushing, APSC, and will begin push for response. As March ends, the time for more direct action is approaching."

•March 22, 1976 — daily log — Schroeder, AOFR.

"Discussion with Elston on Sheep Creek — he is studying possibilities and will start work shortly." ...
Meeting with Arctic, APSC, APO, etc.
"1. Sheep Creek — Fly out with Tinkler and set up work ... Choppered to Sheep Creek with Tinkler/Simmons, then talked to Cushing and Loftus, APSC. Cushing wants to wait for restoration crew to do work. I requested a written guarantee before I'd let B/G off the hook."

•March 23, 1976 — daily log — Schroeder, AOFR.

"Discussion with Loftus, APSC, re: Sheep Creek. Request that he consider doing blasting with very light charges, just to loosen ground for civil crew. Elston to consider the alternatives."

•March 28, 1976 — daily log — AOFR.

"The pre break-up rebuilding of area of Sheep Creek has been shot, but no other activities started. J. Cushing ... is on R & R, so that no one is coordinating pre break-up work—this fact was pointed out to H. Fackler and a request made to get APSC rep. to direct pre break-up restoration or the AOFR will necessarily take steps to insure action. H. Fackler indicated that restoration work to begin with W.P. Crews from north finish, approximately 1 April — no one has been designated to follow up on restoration work until J. Cushing returns ..."

•March 23-31, 1976 — Narrative Surveillance Report — Carl Burger, JFWAT.

Memo indicates that production appears to be getting higher priority than rehabilitation or erosion control again. "To date only RX 1 & 3 are under restoration and Sheep Creek (AS 102) has been blasted for stream restoration. ... (In regard to Sheep Creek, A G pipeline is now welded through the area. Hopefully, the big game crossing which straddles the creek will allow equipment access with channel restoration for fish passage.)"

•March 31, 1976 — daily log — Schroeder, AOFR.

"Sheep Creek channel is wrong place. Loftus says, 'Operator blew it.' Told him we would have to correct and incorporate with old location."

•April 6, 1976 — daily log — AOFR.

"Weekly meeting held at Dietrich. 1. Pre break-up stress. APSC promised their 20-30 beds for civil crew in Telcon with Ferguson, PM, he claimed ignorance of lack of action and says work will be done. Crunches on equipment to haul padding, riprap, etc. Fuel line work . . . tying this up. AIC trucks (6) to be headed this direction tomorrow. Jacobson, APSC, in meeting and will be on top of action. Weather has forced us into an early break-up posture and may cause some trouble. Every effort will be made by the team to get critical items."

•April 14, 1976 — daily log — Schroeder, AOFR.

"Discussion with Cushing on Sheep Creek. Apparently the pooling and filling of the stream channel is preferred by Jack. I'm tired of this one and intend to let the crossing go in as APSC wishes. If it doesn't hold, I suppose we start again (for the 4th time)!"

•April 20, 1976 — daily log — Schroeder, AOFR.

"Tour south with Burger and Hoskins. Sheep Creek not yet correct. Burger to handle request for berm with Cushing. Oil spills at Sheep Creek . . ."

•April 6-14, 1976 — Narrative Surveillance Report — Carl Burger, JFWAT.

"Strong AOFR support initiated the start of APSC's ECl program in our pre-breakup concerns, starting south to north. According to Brent Stonebreaker (APSC management) some five crews will complete as much as possible on the green sheet. At least one crew will concentrate on AOFR Schroeder's list of priorities (fish passage concerns, erosion control, etc.). Work on Sheep Creek restorations [AS 102 is nearing completion]."

•April 13-21, 1976 — Narrative Surveillance Report — Mark Buckley, JFWAT. [Pre-breakup, Sheep Creek]

"It now appears very likely that all our high priority pre-breakup concerns will be adequately addressed. However, Sheep Creek, AS 102, has been worked on, but is incomplete and, therefore, unacceptable. Exigencies of the fuel gasline work in Section VI have drained away some valuable men and equipment from the EC-1 crews, but, hopefully, the schedule will still be met."

•April 20-28, 1976 — Narrative Surveillance Report — Carl Burger, JFWAT.

"LWC and channel reconstruction were implemented at Sheep Creek (AS 102) recently, but not fully in accordance with last year's plans. Advisory Memo 1889 (attached) suggested that additional measures, including full construction to assure fish passage. When passage is provided, JFWAT NCR-1045 should be cleared."

•April 24, 1976 — JFWAT Advisory Memo #1889 — Carl Burger, JFWAT. "Other."

"Reference stips. 2.8.1 and 2.5.1.1. As per our field review and informal discussions with APSC, JFWAT recommends additional bed excavation and/or construction of the small dike at northern extremity of newly built channel adjacent to haul road so that flow integrity is assured. (Rehab crews should be passing this area shortly.) Also, JFWAT still feels that series of pools are necessary below LWC and below HR CMP's to ensure fish passage. Placement of large rocks in channel should also be of benefit to migrating fish."
Action taken by AOFR Knight: "Will advise APSC (Cushing) of above and continue to monitor and take all actions necessary to assure fish passage."

•April 25, 1976 — daily log — Knight, AOFR.

"On Sheep Creek — Burger (JFWAT) to check for fish passage potential."

•May 3, 1976 — daily log — AOFR.

"FM 3800-2 issue for work on Sheep Creek and silt control at AF 103, station 1258. [Sukakpak] Action needed soon."

•May 3, 1976 — APO Field Memo #3800-2 — Schroeder, AOFR. "Green sheet work Sheep Creek; and AS 103." "Other."

"Please take immediate action on the following problem areas involving fish streams: AS 102, Station 933 Sheep Creek: A sand bag or gravel berm is needed to keep creek in the constructed flow channel. Presently more flow goes over the silt area than through the channel. Minimal labor can accomplish this job."

•May 5, 1976 — daily log — Knight, AOFR.

"Made ground and aerial check of area south of Dietrich — some problems which have been previously documented still not resolved such as: Sheep Creek . . ."

•May 6, 1976 — daily log — AOFR.

"Per J. Cushing (APSC) Sheep Creek, sandbag dike to be replaced with permanent dike."

•May 14, 1976 — daily log — Schroeder, AOFR.

"Observed Sheep Creek flow. I see no chance of establishing any sort of important fishery up this stream and am inclined to question going on with rehabilitation."

•May 17, 1976 — daily log — AOFR.

"Tour south with Anderson, MRI, Gustafson, JFWAT, Cushing, and Craig, APSC, to view training dike at 103-0. Resolved all fish issues to all satisfaction. Based on location of bank, I suggested maintaining stream inside of bank to outlet at lower end. 48" CMP will provide adequate discharge capacity, I believe. Culvert through 103-0 access road requires more than 10 foot cut, and the area downstream is not good habitat. This was removed from consideration."

•May 25, 1976 — daily log — Sahr, AOFR.

"Sheep Creek — water has undermined insulation and washed part of insulation downstream. Needs rework."

•May 25, 1976 — Spot-Check Report #089-274 — Anderson MRI.

Description: "Observed washed out LWC — Sheep Creek Work pad. Routine non-conformance."
Explanation: "High water washed out work pad and insulation — obviously this LWC was not installed to correct depth. Suggested remedial action: reinstall when flood waters go down."
AOFR comment: "Discussed with Craig and Cushing, APSC."
Remedial Action Report for SCR 0-89-274. July 16, 1976. Anderson, MRI.

Remedial Action Observed: "Work pad washed out — debris cleaned up. If LWC needed for future, Section IV will do."

•May 30, 1976 — daily log — Schroeder, AOFR.

"Olein, AOFR 6, down to look over crossings — LWC — at fish streams. Problems noted with large rock moving to downstream end and blocking passage . . . Noted the fall line — Sheep Creek fill-in operation without riprap and with mislocated channel completely destroyed by high flows as predicted. Back to the drawing board."

•June 4, 1976 — JFWAT Advisory Memo #2508 — Carl Burger, JFWAT. "Punchlist." "Non-conformance." "Other."

"See attached list of items requiring work. Items 5 and 8 only are non-conformances at present."
Action taken by AOFR Sahr: "See FM 3756."

Attached punchlist: "The following are general and specific items requiring attention in Section V: . . .

(7) AS 102, Sheep Creek. LWC has failed. JFWAT now recommends that insulation pieces be cleaned from stream and channel left for study. Large rocks must be replaced in stream as philosophy barriers, however. Also, widening of the rechanneled portion paralleling haul road may help. JFWAT feels that work pad access should be restricted through Sheep Creek."

•June 4, 1976 — APO Field Memo #3756 — Sahr, AOFR. "Other."

"RE: JFWAT FM 2508 and attach Burger/Sahr 5 June 76. Your attention is directed to the following list of discrepancies which require attention or reply as to intentions:

1. *Immediate attention* — LWC maintenance, are pumping silt excessively — provide fish passage.
2. *Immediate attention* — culvert plug AS 103 north of MS 103.0.
3. AS 100 SC #1, No prior field approval given for construction. Provide drainage around dike tip to river for high river drainage.
4. Immediately south of (3) above take steps to stop erosion of exit of slough.
5. See item #4 of JFWAT FM above (Union Creek). Immediate attention.
6. See item #5 of JFWAT FM above — Immediate attention. [Same for JFWAT items #6 and #7 (Sheep Creek).]
9. Areas of thermal degradation AS 102, 103 and 105 — at this time take steps to insure integrity of Haul Road due to erosion, prevent silting into streams at lower ends.

Work problem of permanent solution.

10. Immediate action — AS 106, station 72+43 fish stream — trench construction nearby.
11. AS 109 — take steps to minimize siltation from road, X-ing to north."

Action taken by Permittee: "Items 1, 2, 3, 6, 8, 10, 11, care of as required within seven days — items 3, 5, 7, 9 required further study and was turned over to Section IV when change over occurred." Noted August 18, 1976 by Sahr.

•June 15, 1976 — Narrative Surveillance Report — Carl Burger, JFWAT.

"The punchlist generated last tour (memo 2508) at AOFR's suggestion has induced some APSC action. Revegetation is progressing well, but there have been no attempts to water or otherwise maintain ceilings or last year's returning vegetation. Low water crossings still need maintenance and more work is necessary at Sheep Creek."

•July 1, 1976 — daily log — Sahr, AOFR.

"NC FM 3962 Sheep Creek Reconstruction of LWC and clean-up."

APO Field Memo #3962, July 1, 1976, Sahr, AOFR. "Nonconformance."

"Reference stips. 2.5.1.1 and 2.7.2.5. You are being cited in violation of the stipulations for obstructing fish passage and debris in Sheep Creek. Verbal request have been made to redesign and reconstruct the Sheep Creek LWC and remove insulation in the creek for the past month, and to date no effort has been made to do so. It is understood that construction activities at this location are the responsibilities of APSC, section IV and Green Associates. However, it is still the responsibility of APSC to comply with the stipulations regardless of the section. Please take the appropriate action to insure the above is accomplished ASAP — you are requested to reply as to action taken regarding the above by 3 July 76."

Action taken by Permittee: "Debris clean up and condition of the LWC acceptable to JFWAT" (No date.).

•June 30–July 7, 1976 — Narrative Surveillance Report — Carl Burger, JFWAT.

"The following Advisory Memos were issued:

#2517. The failure of LWC at Sheep Creek (AS 102) was documented one month ago when JFWAT advised that insulation pieces be removed from stream and that velocity controls (large rock) be considered for fish passage. This memo was issued due to absence of action from Permittees. The memo also advised that general LWC maintenance is necessary through Section V. AOFR Sahr took appropriate action. . . ."

•July 1, 1976 — JFWAT Advisory Memo #2517 — Carl Burger, JFWAT. "Other."

"Reference stips. 2.2.1.1 and 2.5.1.1. This item is not critical or urgent but needs attention, as per our punchlist issued nearly a month ago (JFWAT Memo 2508). Cleanup of LWC failure (insulation pieces, etc.) and placement of a few large rocks for velocity control is again recommended. (Also, LWC maintenance throughout Section V is necessary.)"
Action taken by AOFR Sahr: "Issued NC FM 3962."

•July 8, 1976 — daily log — Schroeer, AOFR.

"Discussed Sheep Creek — Tom, EEI, erroneously estimated flow at ten times Q 50 during a washout. After I pointed out road culvert capacity upstream made that impossible, he agreed his figure must be an error. He did agree the best solution would be to establish natural grade and suggested traffic be routed around after construction."

•September 18, 1976 — JFWAT Advisory Memo #2954 — Gustafson, JFWAT. Location Mostly Haul Road Locations. "Non-Conformance."

"Blocks to fish passage referenced at 2.5.1.1. This is a reminder that HR culverts at *Coon Gulch Creek, Sheep Creek* AS 104 Station 2699, *Natirwik Creek* AS 109 HR 817+50, remain in the non-conformance status. It is already covered by previous JFWAT memos. Request that a remedial action plan be submitted including design, schedule, temporary (during construction) erosion control measures, and permanent erosion control measures. Structure or facility must meet the following requirements:

1. Must not exceed 4 feet per second at Q-5.
2. Needs to be able to withstand Q-50 floods.
3. Bottom of CMP should be 6 inches below water surface at low flow.
4. Needs to be reasonably maintenance free.
5. Should meet above requirements as economically as possible."

No indicated action by AOFR Williams (Department of Highways).

•September 26, 1976 — daily log — Schroeder, AOFR.

"Discussed . . . [and] Sheep Creek — hope problems have been cleaned up — appears to be an agreement between Burger, JFWAT, Cushing, and Craig, APSC."

•October 5, 1976 — daily log — AOFR.

"To Gailbraith to omission agreed to or discussed to be done at 22 September meeting with Keyes and staff and Moolin/Stonebreaker APSC per AOFR Olien request. Items included work at two fish streams, the Sandbag and fishladder AS 101 and Sheep Creek 102. Stonebreaker claims items not discussed and agreed upon, however, they just neglected to be included in notes. I am tired of being in middle and arguing!"

•October 20, 1976 — Spot-Check Report C045-448.

Spot check performed: "Checked progress of rehabilitation work on Sheep Creek and sandbag fishladder on AS 101. Greensheets have been issued and approved for these two prefreezeup items. Routine nonconformance."

Explanation: "Work on these two areas has not started to date."
AOFR Comment: "Track and RAR."

Remedial Action Reort for SCR 45-448.

Action Observed: "Rehab. of Sheep Creek and AS 101 fishladder area has been completed according to approved greensheets." November 4, 1976.

•September 14-22, 1976 — Narrative Surveillance Report — Gustafson, JFWAT.

1. Out of spec CMP's Section V haul road includes Sheep Creek. Reason — velocity.
2. JFWAT linewide inventory. Date 9/22/76. Subject area Work Pad, federal land. Section V.
   Subject area: haul road.
   Includes in part: Sheep Creek Station HR 2018+85.
   Problem: "fish passage blocked; road CMP's never skewed as per original plans."
   Document reference: AM 1045-6/29/75. 1745-9/9/75. 1853-9/24/75. 1864-10/14/75. 1889-4/24/75. 2508-6/5/76. 2517-7/1/76.

   Recommendation: "Re-install HR CMP's as per original plans to provide fish passage; or, construct tie-in channels along west side of road."
   Timing: before break-up '77.

   Subject area: Work pad, federal land.

   AS 102. Station 933+01. Problem: "Fish passage block; inadequate erosion control."
   Document reference: AM 1045-6/29/75. 1745-9/9/75. 1853-9/24/75. AM 1864-10/14/75. AM 1889-4/24/75. AM 2508-6/5/76. AM 2517-7/1/76.

   Recommendation: "Provide fish passage and implement adequate erosion control measures."
   Timing: before break-up '77.

•September 28–October 6, 1976 — Narrative Surveillance Report — Jack Gustafson, JFWAT.

"Priority pre-freeze of items which should be worked on as soon as possible include:

(b) AS 102 HR 2018+85: need a plan and execution of the plan for rehab of Sheep Creek."

•October 12-19, 1976 — Narrative Surveillance Report — Jack Gustafson, JFWAT.

"Green sheets have been issued for work at Sheep Creek and the sandbag 'fish ladder.' According to APSC Engineer, the contractor will be doing the work in this coming week."

•October 26–November 3, 1976 — Narrative Surveillance Report — Jack Gustafson, JFWAT.

"At long last Sheep Creek (AS 102 HR 2018+85) . . . has received some attention . . . a slightly meandered, riprap-lined channel with energy dissipators has been constructed at Sheep Creek. The HR culverts remain unchanged. The effectiveness of this solution will be evaluated after break-up."

•March 3, 1977 — Environmental Check Report #009-849.

"Inspected pre-breakup scheduled cross-drainage structures at the following locations: AS 102, station 933+00. — Sheep Creek. Install insulated LWC, 10 feet N of Bent 59, status incomplete. Remarks: Excessive aufeis, must wait melting.

•March 8, 1977 — JFWAT Advisory Memo #3469. "Other."

"The attached comments pertain to a list I found by accident in which Del Chapman, APSC, requested JFWAT input. They relate to drainage/erosion/restoration problems on AS 104-114. Please relay the attached three-page comment to APSC."

Action taken by AOFR Berus: "Will be done!"

The attached list included, in part: "Haul Road CMPs: AS 102 HR 2018+85 — fish passage problems, AS 103 HR 2373+80 — fish passage, AS 113 HR 1053-28 (3 CMPs) — fish passage problems. Additional items on JFWAT pre-break up punch list 9/22/76 not included on APSC list. A. AS 102 933+01. Providing fish passage in erosion control measures on work pad. [illegible] have been on But-list. . . ."

•April 19, 1977 — Environmental Check Report #024-830 — Anderson, MRI.

Check performed: "Observed work on LWC on work pad — Sheep Creek several feet of aufeis had been removed and dozer was digging below thalweg in preparation for placing insulated X-ing. Work was also proceeding below haul road culvert at PL station 1144 in an attempt to halt thermal erosion . . ."

Summary recommendation: "LWC at Sheep Creek more extensive than greensheet calls for. Road for mine owner not yet built. Work on Highway CMP drainage appear satisfactory . . . All Pre-breakup items."

•April 27, 1977 — JFWAT Advisory memo #3519 — Jack Gustafson — JFWAT.

"Reference AS 16.05.870 and stip. 2.5.1.1. The contractor has installed the insulated LWC at Sheep Creek and its sure *looks* nice. However, it appears that the top layer of riprap fill will 'French drain' all that high flows and serve to block fish passage. Correct 'French drain' effect pre-breakup."

Action taken by AOFR Sahr: "Per agreement with Jack G., will wait for breakup to further evaluate effects of riprap in stream."

•May 2, 1977 — JFWAT Advisory Memo 3531. "Other."

"Attached is a seven page list of the status of 30 priority pre-breakup fish sensitive items between Many Creek (AS 100) and Atigan River No. 2 (AS 114). This was monitored yesterday. Of these 30 items, 11 (37%) had been worked and are acceptable; five (17%) have been worked and are not acceptable; nine (30%) have not been worked or are in process; and five (17%) are new items. Of the previously identified items, 44% are worked and acceptable, 20% are worked and not acceptable, and 36% are not worked."

Action taken by AOFR Berus: "FM 4729."

Attached list includes: "AS 102 (1) Sheep Creek, Station 933+00; (JFWAT AM 3519). Have worked. Not acceptable, but can remedy after breakup. Water will 'French drain.' Fish passage appears to be blocked by riprap. . . ."

•May 3, 1977 — Environmental Check Report #047-830 (AS 100-107).

"Reviewed all items on Section V pre-breakup list requiring continuing surveillance until complete. . . . AS 102 — Sheep Creek, Sta. 933 — will need work — bottom now French drain — no fish passage due to massive aufeis upstream.

•May, 1977 — APO Field Memo #4745.

Illegible, but referred to an attached sheet. "13 items of major . . . concerns that needs attention . . ." List includes: AS 102 Station 933+00. *Sheep Creek*. May still have problems ensuring fish passage to east side of culvert."

Work completed: "JFWAT to monitor during breakup."

•May 10-18, 1977 — Narrative Surveillance Report — Gustafson, JFWAT.

"JFWAT AM 3548 and 3549 clarify the remaining fish sensitive pre-breakup work as of May 14, 1977. On 5/18 the four remaining fish sensitive items which were on the original list that required completion work . . . Two fish sensitive items identified on the original list require additional work after breakup (Sheep Creek . . .)."

•May 11, 1977 — Environmental Check Report #016-833.

Check performed: "Review of status of uncompleted pre-breakup '77 items. AS 102 Sheep Creek — no work — aufeis between WP and haul road."

•May 13, 1977 — Environmental Check Report #023-833. Location . . . AS 102, station 933+00. Sheep Creek.

"Passing lots of water — aufeis upstream. LWC too wide to pass fish — needs 'V' bottom for low water and some work on downstream side to meet original streambed."

AOFR comment: "FM 4760."

•May 13, 1977 — Environmental Check Report #403-835.

Check Performed: "Checked progress of following pre-breakup items. (RE: APO pre-breakup list of 5/1/77.) These items have not been completed satisfactorily: 1. AS 102, station 933+00 Sheep Creek — LWC not satisfatory to assure fish passage."

AOFR comment: "FM 4760."

•May 14 — JFWAT Advisory Memo 3549 — Gustafson, JFWAT. Location: Line wide.

"The attachment (two pages) identifies Fish Sensitive Items not on the original list which require pre-breakup work and items on original list which may require additional post-breakup work. (O&M repsonsibility.)"

Action taken by AOFR: "FM 4760."

List includes: "AS 102, Station 933+01. Sheep Creek (on original list). Riprap will probably 'French drain' low flows. Agreed with Jim Sahr that they could remedy after monitoring at post-breakup . . ."

•May 18, 1977 — Environmental Check Report #039-833 — Anderson, MFI

Various locations including, in part "AS 102 — Sheep Creek — plenty of water — will pass fish today — more work later."

•May 29, 1977 — JFWAT Advisory Memo #3575 — Gustafson, JFWAT. "Non-conformance."

"Reference stip. 2.6.1.1. It appears that the LWC at Sheep Creek will not be a 'French Drain,' as suggested in AM 3519. However, the steep gradient and lack of a thalweg will inhibit fish passage. Provide for fish passage.

Action taken by AOFR Berus: "FM 4771."

•June 2, 1977 — Environmental Check Report #010-834. Various locations. . . .

"AS 102, station 933+00 Sheep Creek — was breached, but equipment filled in again today and definite fish blockage today — new plan is in the mail."

•June 4, 1977 — JFWAT Advisory Memo #3683 — Robert Hallock, JFWAT. "Non-conformance."

"It is recommended that the LWC at Sheep Creek be graded to match the thalweg per typical drawing, D-00-C1310. The channel should be confined to about 10 feet in width with hand-placed riprap like the section between the pad and the haul road designed by Jack Cushing, Alyeska."

Action taken by AOFR Berus: "OK will request."

In the AOFR Log attached to JFWAT Advisory Memo #3683 dated June 4, 1977 is part of a memorandum to Moolin from Berus dated June 7, 1977.

Subject: "Fish related problems in northern district, federal lands, and wildlife.

"This 9-page memorandum with attachment 'A' is the result of a recent JFWAT linewide inventory requested by this AOFR. All of the items shall be addressed in writing by APSC item by item by close of business 13 June '77. They will be expected to be shown in schedule form for completion prior to non-Fish and Wildlife restoration work.

"Those items that your office may find disagreement with shall be dealt with APO in Anchorage as AOFR is not in position to give any relief of that as JFWAT has cited a stip violation for every one."

List includes: ". . . AS 102, station 933+01. JFWAT recommends that the LWC be graded to match the thalweg per typical drawing D-00-C131 with maximum 10 foot wide channel and riprap be hand placed across pad as per the way it is between pad and HR."

Appendix D

Analysis of the Costs of Delay in the Trans-Alaska Oil Pipeline Project

by
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Analysis of the Costs of Delay in the Trans-Alaska Oil Pipeline Project

Because of the apparent importance of keeping the Alyeska pipeline on schedule and the high actual costs involved, this paper discusses the anticipated costs of *not* meeting the construction schedule of the trans-Alaska pipeline project for three of the principal decision-making bodies involved in the project: Alyeska's owner companies (as a group), the State of Alaska, and the U.S. government, especially the Department of the Interior.

The paper begins by looking at conditions which tend to increase pipeline construction costs, and which Alyeska apparently accepted in order to meet a tight construction schedule. This is followed by a discussion of Alyeska's (actually, the owner companies') financial incentives for accepting high construction costs, to stay on schedule, and the incentives for the state and federal governments to expedite completion of the pipeline as much as possible.

Conditions Tending to Increase Construction Costs

There are several aspects to the costs of an operation the size of the trans-Alaska oil pipeline project, including the sheer size of such costs. The following conditions increase the unit costs of production programs:

1. Short planning horizons tend to increase costs per unit of work by reducing the testing time for new methods and equipment, causing shortcuts and compromises in organization, and forcing the firm to pay premiums for materials, equipment, and labor in order to assemble them on time to begin operations. Changes in management structure that bring new planners into the project can reduce the advantage of a long lead time.
2. Allowing shorter construction periods to produce a given volume of work tends to increase costs per unit of work by restricting the range of options in construction techniques, forcing the utilization of less-than-efficient proportions of labor, machines, and materials, and compelling the labor force and machinery to operate at inefficient rates.
3. Restrictive conditions imposed on the project to achieve social goals other than the building of the project (e.g., environmental protection) tend to increase the private costs of the project by forcing the allocation of labor, machinery, and materials to activities which are not physically necessary to accomplish the primary goal of the project, or by reducing the efficiency of activities which are necessary to complete the project, or both.
4. Standards for contract completion which stipulate a product superior to that desired by the user of the product tend to increase project cost because of better materials used.
5. Contract conditions such as no-strike clauses and reimbursable-cost subcontracts tend to increase costs because unions do not typically give up the right to strike without compensation, and because there is little financial incentive for subcontractors to minimize cost when they are fully reimbursed.
6. Learning occurs over the life of a project or a series of projects and tends to reduce the costs of performing a fixed unit of work. Learning improves management performance, production schedules, allocation of personnel, materials allocation and accounting, and specific skill performances. The less opportunity there is to learn from mistakes and to alter procedures, the more unfamiliar the job, techniques used, and operating environment, and the more frequently and radically the operating environment changes, the higher will be the operating costs.

Alyeska's Acceptance of High-Cost Conditions

In view of these factors, the operating environment in which the Alyeska consortium found themselves during the planning and construction of the trans-Alaska oil pipeline project almost guaranteed that high construction costs would be incurred. The project had a rather long lead time by most standards: from July 1968 to April 1974. However, the Alyeska Pipeline Service Company was not formed until August of 1970, and the management team was changed frequently during the period 1970-1975.[1] Construction management planning by Bechtel, the actual planner and original construction management contractor for pipeline and road construction activities, did not begin until October 1973, six months before construction began. (Fluor Engineers were hired in December 1972 to plan and construct the terminal and pump stations.)[2] Alyeska took over Bechtel's functions in May 1975, bringing a different management group into the middle of an ongoing project. While this is not evidence that the project was not accorded enough lead time, it seems likely that the planning function was disrupted by the necessity to switch management responsibilities, which would have extended the learning period of the management level, disrupted planning, and raised cost.[3]

The project was designed to be executed in the space of about three years. In order to stay on that construction schedule, Alyeska employed almost twice the number of people as they anticipated as late as 1971.[4] In spite of the fact that housing and meals were provided, the Project Labor Agreement provided for Alaska standard craft wages, time-and-a-half for overtime (beyond 8 hours per day, 40 hours per week), and double time for some Sunday and holiday work. Since the standard shift was 10 hours per day, and 70-hour weeks were common,[5] the labor costs of staying on schedule were enormous, and labor manhours ran far over the budgeted amount both in 1975 and 1976. According to the U.S. General Accounting Office, direct labor manhours overran estimated amounts required to complete the project by about 53 percent.[6]

Certainly part of the increase in labor costs may have resulted from work related to government requirements to redo work to comply with either environmental or safety stipulations. The digging up and rechecking and rewelding of many sections of pipe in 1976 is an example of such regulations requiring work not considered necessary by the contractor or pipeline user, but was necessary if the project was to be allowed to proceed.

Reimbursable-cost contracts and no-strike clauses were negotiated with Alyeska's execution subcontractors and the various labor unions in August 1972[7] and April 1974,[8] respectively. The incentive structure in the subcontractor incentive system developed and implemented (but later dropped) by Alyeska in late 1975[9] provided bonuses for work finished if the work was done at or under Alyeska's estimated cost, combined with an extra incentive for on-time completion.[10] The fact that bonuses to subcontractors were proposed by Alyeska for on-time completion during a period in late 1975 when project cost overruns were a primary concern also indicated the importance of on-time completion to Alyeska.

Costs of Delay in the Project

Alyeska appeared to accept higher construction cost when the choice would have involved project delay. One may demonstrate what the value of early project completion was to Alyeska and the parent oil companies by asking how costly delay might have been to the consortium.

In this calculation, as in those that follow, we attempt to measure the cost per unit of time of delay, settling on one year as an example. The relevant cost is the foregone benefit of earlier completion, as seen at the time decisions were made, which enabled the project to stay on schedule. This "time of decision" is somewhat arbitrarily chosen in the examples that follow, yet the calculations still provide a useful illustration of the incentives involved.

Sample calculations appear in Table 1, which gives a rough estimate of the perceived magnitude of the costs to the Alyeska consortium of a one-year delay in construction due to postponed startup as perceived in 1974 prior to beginning work. The table also lists costs to the consortium of an extra year of construction time, as perceived in 1974, after construction had begun. Both estimates are in 1977 constant dollars.

Table 1

COSTS TO ALYESKA CONSORTIUM OF DELAYED PIPELINE COMPLETION

1. Increase in out-of-pocket construction costs due to delay:

Assumptions

- Pre-construction cost increase 1969-1974: $3.2 billion ($7.7 billion total cost, estimated May, 1977).[1]
- Implied total cost, without pre-construction increases: $4.5 billion
- Ratio of May, 1977, estimate to estimate without pre-construction cost increases = 1.71111.
- Implied average annual rate of pre-construction cost increase = 14.37%[2]
- Implied average annual rate of project cost increase during construction = 15.43%[3]
- Implied average annual rate of construction cost inflation = 12.04%[4]
- Implied discount rate for project cost evaluation = 10%[5]

Calculations

a. Implied cost of one-year additional delay in start date, assuming prevailing rate of pre-construction cost increase 1969-1974:

3-Year Construction Schedule

	1974	1975	1976	1977	1978	
Total Outlays (Billion $)	2.00	1.142	1.318	1.522	—0—	= 5.982[6]
Outlays in 1974 Dollars (12.04% Inflation Rate)	2.000	1.019	1.050	1.082	—0—	= 5.151
Present Value of Outlays (10% Discount Rate)	2.000	0.926	0.868	0.813	—0—	= 4.607
Present Value of Outlays in 1977 Dollars (12.04% Inflation Rate)						= 6.479

Delayed Construction Schedule

		1975	1976	1977	1978	
Total Outlays (Billion $)	—0—	2.287	1.306	1.507	1.721	= 6.821[7]
Outlays in 1974 Dollars (12.04% Inflation Rate)	—0—	2.079	1.040	1.072	1.092	= 5.283
Present Value of Outlays (10% Discount Rate)	—0—	1.890	0.860	0.805	0.746	= 4.301
Present Value of Outlays in 1977 Dollars (12.04% Inflation Rate)						= 6.049
Reduction in out-of-pocket costs from project delay (1977 $)						= ($.430) billion

b. Implied cost of one-year additional construction time at prevailing rates of construction cost increase, 1974-77:

3-Year Construction Schedule

	1975	1976	1977	1978	
Construction Outlays 1975-1977 (Billion $)	1.142	1.318	1.522	—0—	= 3.982[8]
Outlays in 1974 Dollars (12.04% Inflation Rate)	1.019	1.050	1.082	—0—	= 3.151
Present Value of Outlays (10% Discount Rate)	0.926	0.868	0.813	—0—	= 2.607
Present Value of 1975-1977 Outlays in 1977 Dollars (12.04% Inflation Rate)					= 3.667

4-Year Construction Schedule

	1975	1976	1977	1978	
1974 Construction Outlays 1975-1978	.788	.796	.797	.797	= 3.178[9]
Present Value of Outlays (10% Discount Rate)	.716	.723	.659	.599	= 2.697
Present Value of 1975-1978 Outlays in 1977 Dollars (12.04% Inflation Rate)					3.793
Increase in out-of-pocket costs from additional year of construction (1977 Dollars)					$ .126 billion

Adjustment for Real Cost Increases in 4-Year Construction Schedule

	1975	1976	1977	1978	
1974$ Outlays for 3-Year Schedule	1.019	1.050	1.082	—0—	= 3.151
Equal Outlays for 4-Years (1974 Dollars)	.788	.788	.788	.787	= 3.151
Expenditures Postponed for 4-Year Schedule	(.231)	(.262)	(.294)	—0—	= (.787)
	—0—	.239	.271	.304	= 8.14
1974$ Cost Increases from Postponing Some	——	(.231)	(.262)	(.294)	= (.787)
Expenditures to the Following Year	—0—	.008	.009	.010	= .027
Sum of Equal Outlays and Cost Increases, 1974 Dollars	.788	.796	.797	.797	= 3.178

2. Delayed production of oil:

Assumptions

- Planned throughput: 600 thousand barrels per day initially, 1.2 million per day after two months, for 20 years[10]
- Price of oil at wellhead: $5 per barrel in 1974, increasing at an average of 10% per year through 1979, 5% per year thereafter[11]
- Assumed lifting cost: 50 cents per barrel. Increase at same rate as oil prices[12]

Cost Calculations

	1977	1978	1979	1980	1997	1998[13]
a. Gross Revenue (billion $):						
Without Delay	$1.213	$3.204	$3.524	$3.701	$8.480	$—0—
With Delay	—0—	1.335	3.524	3.701	8.480	8.907
b. Difference in Gross Revenue	1.213	1.869	—0—	—0—	—0—	(8.907)
Less: Lifting Costs (50¢/bbl)	.110	.140	—0—	—0—	—0—	(.608)
Less: State Royalties (12.5% of b)	.152	.234	—0—	—0—	—0—	(1.113)
c. Oil Company Share of Revenue	.951	1.495	—0—	—0—	—0—	(7.186)
d. Less: State Severance Tax (7.5% of c)	.071	.112	—0—	—0—	—0—	(.539)
Difference in Net Wellhead Revenue	$ .880	$1.383	$—0—	$—0—	$—0—	$(6.647)
Difference in Present Worth (at 10% discount rate)	.880	1.257	—0—	—0—	—0—	(.898)
Difference in Constant Dollar Present Worth	.880	1.140	—0—	—0—	—0—	(.294)

Total Present Worth of Foregone Value of Production = $1.239 billion ($1.726 billion, 1977 dollars)

Footnotes, Table 1

1. Speech by E. L. Patton, Chairman and Chief Executive Officer, Alyeska Pipeline Service Company, to the Town Hall of California, May 17, 1977, Los Angeles.
2. Found by solving $x^4 = 1.71111$ for x.
3. Computed by the following methodology: $5.982 billion was the nominal dollar estimate of outlays to the end of construction in mid-1977, as of October, 1974. By May, 1975, one year after project startup, expenditures had exceeded $2 billion and committed funds, in excess of $4 billion. We assume one-half of these funds had been committed by October, 1974. Therefore, remaining expected expenditures were $3.982 billion as of that date. Since total project outlays increased to $7.7 billion by the May, 1977, estimate, or $1.718 billion over a two and one-half year period, and this increase came on the uncommitted portion of funds, the implied rate of project cost increase is obtained by solving for the following relationship for x:

   $$x^{2.5} = 5.7/3.982$$

   The October, 1974, estimate was described by Patton in his Los Angeles speech (n.1) as the "first meaningful estimate" of project cost.
4. Average annual rate of increase in the period 1969-1974, of the Engineering News Record Index of construction costs, as reported in U.S. Department of Commerce *Survey of Current Business*, various issues.
5. Ten percent assumes 2/3 of project finance comes from bonds with an effective yield of 7.5 percent; 1/3 from equity capital at a before-tax yield of 15 percent.
6. Distribution computed from October, 1974, estimate, using assumed nominal dollar rate of increase in project outlays of 15.43 percent per annum, by solving for x:

   $$x + x(1.1543) + x(1.1543)^2 = \$3.982 \text{ billion},$$

   which yields x = $1.142 billion. This calculation varies from footnote 8 in that it assumes the first $2.0 billion has not yet been spent.
7. The distribution was developed by moving the distribution of expenditures into the future by one year, and multiplying each planning cost by 14.37 percent, the rate of pre-construction cost increase.
8. Same as footnote 6, except that the $2.0 billion spent by October 1974 is ignored, since it would have been uninfluenced by attempts to stay on schedule after that date.
9. Computed from the 3-year schedule, using the Adjustment for Real Cost Increases schedule. It is reasonable to suppose that there would be some increase in "real" dollar cost as the schedule of the Alyeska project is stretched out to 4 years. We have assumed here that management foresaw (accurately) the actual 15.43 percent rate of increase in nominal cost between 1974 and 1977, which is 3.39 percent above the 1969-1974 rate of "inflation" increase in the Engineering News Record index, but that they wrongly assumed additional real cost increases which occurred after October 1974 to be zero.
10. *Oil and Gas Journal*, June 27, 1977, pp. 66-67. The effect of the loss of Pump Station 8 is to make maximum possible throughput about 800,000 barrels per day until Spring 1978. Further expansions to 1.6 million or 2.0 million barrels predicted in the spring of 1974 were to be considered carefully. *Oil and Gas Journal*, March 18, 1974, p. 97. It now appears likely that expansion to 1.6 million barrels will be undertaken only slowly, due to the West Coast oil surplus.
11. Estimate in 1974 terms, based on $3.00 per barrel pipeline tariff estimated by an Alyeska official in 1974, linked to a pipeline construction cost of about $6 billion, about $1 barrel tankerage, and a $9 per barrel refinery gate price in California, based on "ARCO Hikes Prices for California Oil," *Oil and Gas Journal*, March 18, 1974. On this basis, 1977 wellhead price is approximately $6.65, close to Alaska Department of Revenue best current estimates of $6.53-$7.00. The increase is expected to take account of world inflation through the year 2000 and does not include real increases in oil value.
12. Lifting costs are unknown. They were estimated by M.A. Adelman in 1971 at between 18 and 26 cents per barrel. They are doubled here to reflect increases in costs since 1971 and to provide a margin for uncertainty. See M.A. Adelman et al. *Alaska Oil: Cost and Supply* (New York: Praeger, 1971), pp. 21-23.
13. Intended to include all impacts after 1997.

Costs of delayed startup in this case equal the algebraic sum of construction cost savings in calculation (1a), and lost revenues in calculation (2), or about 1.296 billion 1977 dollars. If the project had been stretched out for one more year, based on the 1974-1977 experience, calculations (1b) and (2) show a cost of delay of about 1.852 billion 1977 dollars. The amount of money involved is clearly substantial even after corporate income taxes are subtracted. Even if the combination of corporate income tax savings and our over-estimation of the true rate of cost increase reduces the impact of delays by 50 percent in each case, the total cost impact to the consortium of a one-year delay in startup still would have been $648 million 1977 dollars, while it would have been $926 million in the case where the construction period is stretched out an additional year. Consequently, it was evidently well worth it to the owner companies to spend very large sums to start construction as soon as possible and to stay on schedule, once the decision was made to proceed with construction of the pipeline.

Cost Recovery

Since the additional cost could presumably be recovered by the pipeline consortium in tariffs which eventually become earnings of the owner companies (indeed, the above calculations crudely imply the amount of the tariff increase), one may reasonably ask in what sense Alyeska's costs are "real" costs to the owner companies and in what sense they are mere accounting charges but not real costs. The most useful and simple way to think about the problem is to note first of all that the companies have little or no control over the maximum price for which they can sell their oil to refineries, since this is determined by competition with foreign oil. Secondly, the recovery of cost over time by pipeline tariffs can be viewed as a charge of part of the owner company (Alyeska) to another part (the production division of the owner company). Since the delivered price of oil is (and tanker charges are) basically outside of company control, the only way for pipeline costs to go up is if the netback wellhead price goes down. Thus, even if the increased costs are "recovered" by Alyeska, they are "paid" by the owner companies (and by the State of Alaska through reduced royalties and taxes) in the form of reduced wellhead prices. Therefore, the extra costs of pipeline construction represent a true cost to the owner companies over time. Even the apparent benefit to the owner companies from sharing the reduction in wellhead price is offset to some extent by payments of revenue-related taxes by Alyeska to Alaska.

Costs of Delay to the State of Alaska

As principal royalty owner in the Prudhoe Bay oil field (the Alaskan Native Fund receives 2 percent of the gross wellhead value of production, up to the limit of $500 million under the Alaska Native Claims Settlement Act), the State of Alaska had a clear financial interest in expediting the construction of the trans-Alaska pipeline. In addition, the state had interests in the early completion of the line because of its status as a taxing jurisdiction and because of its interest in reducing unemployment and increasing the incomes of Alaskans. Table 2 contains computations from the vantage point of 1974, estimating the financial cost to the state of delays in pipeline startup and completion. As can be seen by working through the computations, given initial pipeline throughput of 600 thousand barrels per day (rising to 1.2 million barrels after two months), wellhead price of oil rising from $5 per barrel in 1974 at 10 percent per year until 1979 and 5 percent thereafter, lifting costs of 50 cents per barrel, royalties at 12.5 percent of wellhead value, severance taxes at an average of 7.5 percent of wellhead value, and property taxes at 20 mills on taxable pipeline property, the 1974 present worth of the total cost to the state expressed in nominal dollar terms would have been in excess of $181 million ($340 million in constant 1977 dollar terms).[11] The state clearly could have understood the magnitude of this direct financial cost of delay in 1974, and subsequent additions to the severance tax rate to an approximate average of 11.5 percent on North Slope production further increased the state's financial stake in early completion.

Table 2
COST TO THE STATE OF ALASKA OF DELAYED PIPELINE COMPLETION
(Billions of Dollars)

Assumptions
(Same as in Table 1)

Cost Calculations

	1977	1978	1979	1980	1984	1997	1998
a. Gross Revenue (billion $):							
Without Delay	$1.213	$3.204	$3.524	$3.701	$4.724	$8.480	$—0—
With Delay	—0—	1.335	3.524	3.701	4.724	8.480	8.907
b. Difference in Gross Revenue	1.213	1.869	—0—	—0—	—0—	—0—	(8.907)
c. Net State Royalties[1] (10.5% of b)	.127	.196	—0—	—0—	(.061)	—0—	(.935)
d. State Severance Tax (7.5% of b)	.091	.140	—0—	—0—	—0—	—0—	(.668)
e. Pipeline Property Tax[2]	.058	.027	—0—	—0—	—0—	—0—	—0—
Difference in Direct Revenue	$ .276	$ .363	$—0—	$—0—	$(.061)	$—0—	$(1.603)
Difference in Present Worth (at 8% discount rate)	$ .276	$ .306	$—0—	$—0—	$(.036)	$—0—	$(.318)
Difference in Constant Dollar Present Worth, 1977	$ .276	$ .278	$—0—	$—0—	$(.022)	$—0—	$(.104)

Total Present Worth of Foregone Revenues = $228 million ($428 million, 1977 dollars).
Total Present Worth of Foregone Revenues in 1974 (8% discount) = $181 million ($340 million, 1977 dollars).

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[1] State royalty rate of 12.5 percent, less 2 percent ANCSA payments to Natives. 1984 figure represents faster payout of overriding 2 percent royalty, in no delay case. Both cases reach $500 million in 1984.

[2] FY 1977 computed as the difference between *Revenue Sources* revised estimate for 1977 and the actual value for 1976. All other years: Based on the difference between FY 1978 estimate and FY 1977 revised estimate for 1978; zero for all other years after pipeline completion.

Nor is this all. Table 2 leaves out the impact on the state's income tax collections of slowed-down or postponed construction. Clearly this is a far more difficult computation, since it is not clear what total Alaskan employment or wages and salaries would have been if the project had either been delayed at startup or completion. It seems possible, however, that if the same number of labor hours had been expended later (due to startup delays), or less intensively (due to letting the construction schedule stop by refusal to pay overtime, for example), there could have been a substantial lowering of wage and salary income in the period 1974-77, without sufficient compensating increases in 1978.[12] In addition, the state had a clear stake in reducing unemployment and in providing jobs for its citizens, and delays in startup or the extending of the construction schedule would have extended the years of relatively high unemployment of the early 1970s in the first case, and could have reduced employment opportunities and incomes of some Alaskans in the second case.[13]

Costs of Delay to the Nation as Perceived by the Federal Government

Among the aspects of delay with which the federal government might have been concerned, besides the impact on the producing companies and Alaska, were: the effect on the national defense capability of increasing dependence on foreign (especially Eastern Hemisphere) oil; the adverse impact of large foreign purchases of oil on the U.S. balance of payments; possible reduced federal tax revenues; the reduced possibility of holding down the rate of increase of consumer and producer energy costs; and for the Interior Department, which has a fiduciary responsibility for Native claims, the disruption of payments of the 2 percent of production value into the Alaska Native Fund established by the Alaska Native Claims Settlement Act. In assuring compliance with the various environmental and technical stipulations on the projects, the government was in a position to cause delay in startup of the pipeline project, and in a position to slow down completion, once the construction had begun. The costs of such delay were apparently perceived as significant, if not substantial, and could have contributed to a mood in favor of expediting construction, wherever possible.

The Department of the Interior *Analysis of the Economic and Security Aspects of the Trans-Alaska Pipeline*, a three-volume study published in 1971-72, outlines in several places the federal government's and other parties' specific concerns with heavy dependence on foreign oil, especially that produced in the Eastern Hemisphere. Dr. William A. Vogley, Director of the Office of Economic Analysis at the U.S. Department of the Interior, stated five major findings of the study. The third of these was:

> The development of North Slope oil is an important national security objective: the Trans-Alaska Pipeline System can deliver oil sooner than the other efficient mode.

With respect to the transportation alternatives, the major national security conclusions by General George A. Lincoln, Office of Emergency Preparedness, were:

1. It was important to get North Slope oil to the Lower 48 states as soon as possible so as to lessen U.S. dependence on potentially insecure foreign sources of petroleum.
2. The trans-Alaska oil pipeline could bring North Slope oil to the market an estimated three years sooner than a MacKenzie Valley route.
3. Early completion of the Alaska pipeline must be considered an important national security objective.

Lincoln partially relied on Interior's Office of Oil and Gas analysis which indicated Eastern Hemisphere sources of oil and gas would supply 33 percent of demand in Petroleum Administration for Defense District V (PAD V) by 1975 and 46 percent by 1980, which he considered an "unacceptable" level. In an accompanying analysis, Lincoln stated that a "significant delay" in utilizing North Slope oil could have serious national security implications, since it would happen at a time when the U.S. was more dependent on insecure foreign sources, and since lack of transportation facilities would retard further exploration and development necessary to lessen the dependence.[14]

Federal security concerns about foreign supply, as identified in a U.S. Cabinet Task Force report, *The Oil Import Question*, in 1970 remained throughout the application and construction period as incentives for the federal government to expedite production:

1. War might increase domestic petroleum demand, or cause the loss of tankers supplying the U.S.
2. Local or regional revolution, hostilities, radical governments in exporting countries, communist diplomatic or military pressure, or guerrilla activities might physically disrupt foreign sources or transportation.
3. A group of exporting countries might act to deny their oil to us, either in parallel or in concert.
4. Exporting countries might take over the assets of American or European companies.
5. Exporting countries might form an effective cartel, raising oil prices substantially.[15]

To put these concerns of the federal government in perspective, it is obvious that since 1971, the last three difficulties have actually occurred to a greater or lesser extent. Moreover, in 1976, the average estimated U.S. requirements for crude oil runs to refineries were 13.4 million barrels per day, of which 5.3 million, or 39.6 percent, were foreign in origin.[16] The Federal Energy Administration figures for January through July 1977 show dependency of nearly 46 percent, or 6.7 million barrels per day.[17] Six hundred thousand daily barrels would have reduced 1977 dependency in the first seven months by 4 to 5 percent, while 1.2 million barrels per day would have reduced dependency from 46.0 percent down to 37.7 percent. In all, the potential problems caused by pipeline delay would have been to exacerbate a dependency which was growing at 4 to 9 percentage points per year and which had uncertain, but adverse, national security consequences.[18]

At the time that the Interior Department analyzed the national impacts of delays in the trans-Alaska pipeline construction in 1971, it was thought (and hoped) that North Slope oil delivered by pipeline to Valdez would reduce resource (capital and labor) costs for oil consumed in the United States. If crude oil could have been produced and delivered to the U.S. consumer for lower resource cost than the purchase price of foreign crude, the difference represents a net saving to the nation. An estimate of resource cost savings appears in Table 3.

The crucial question to the consumer is: would this reduced cost be reflected in lower prices for products using oil? The answer seems to be that Alaska state taxes, federal taxes, and company profits will take up most of the difference between resource costs of producing plus delivering North Slope oil and the purchase cost of foreign crude oil, while the consumer is charged a price based on the marginal supply cost—roughly, the refinery gate price of the foreign producer. It may be that federal government hoped to share with the consumer the lower resources cost of oil-based fuels and products made from North Slope oil through its system of controlled crude oil prices administered by the FEA, or increased competition in PAD V (West Coast U.S.). Regardless, the savings

Table 3

CALCULATION OF RESOURCE COST SAVINGS FROM NORTH SLOPE CRUDE OIL

(1977 Constant Dollars)

Assumptions

Delivered Price of Foreign Crude Oil in Los Angeles, per barrel		$13.50
Resource Costs of North Slope Crude Oil:		
Production costs	$ .50 per barrel	
Pipeline tariff to Valdez	6.00 per barrel	
Tanker to California	1.00 per barrel	
Total		7.50
Resource Cost Savings to Economy, per barrel		$ 6.00

Calculations

Cost of Delayed Production to the Economy (Output assumptions same as Table 1): Billions of 1977 Dollars

	1977	*1978*	*1979*	*1980*	...	*1997*	*1998*
Without Delay	$1.098	$2.628	$2.628	$2.628		$2.628	$ 0
With 1-Year Delay	0	1.098	2.628	2.628		2.628	2.628
Difference	$1.09	$1.530	$ 0	$ 0		$ 0	$(2.628)
Present Value (10%)	1.09	1.391	0	0		0	(.355)
Present Value (8%)	1.09	1.417	0	0		0	(.522)

Present Value of One-Year Delay in Pipeline Completion: $2.126 billion (10% discount rate) — $1.985 billion (8% discount rate) in 1977.

1974 Present Value of One-Year Delay in Pipeline Completion: $1.597 billion (10% discount rate) — $1.576 billion (8% discount rate).

to the economy as a whole and the losses resulting from pipeline completion delays were still substantial.

The opportunity cost of private resources in the economy can generally be taken as 10 percent. In such a case, the present value of cost savings foregone from a one-year delay as seen in 1974 would have been $1.597 billion, expressed in 1977 constant dollars. Even if the government used a discount rate of only 8 percent, reflecting the marginal cost of borrowed funds in bond markets, the total resource cost of a one-year delay in the pipeline would have been $1.576 billion.

Another aspect of "costs" to the nation was the negative impact of purchases of foreign oil on the U.S. balance of payments, or the net amount by which U.S. dollar outflows could be expected to exceed inflows. The federal government had reason to consider the effect on balance of payments over the long run, and expedite construction of a domestic oil source (the pipeline) to reduce that deficit. However, it should be noted that a single year's delay in pipeline construction, while contributing to the deficit marginally, would not be as important from a policy standpoint as a failure to build the pipeline, or a failure to build on a route which would maximize the balance of payments advantage.

The 1971 Interior Department study identified several reports which attempted to measure the balance of payments impact of Alaskan oil. Except for one analysis by Alyeska Pipeline Service Company, all these reports were based on the balance of payments appendix of the 1970 Cabinet Task Force Study, *The Oil Import Question*, with differences in findings arising out of varying assumptions and interpretations of data contained in the original report. The balance of payments effects of importing additional oil was assumed to consist primarily of the first round retained value of oil in the foregin country (that is, payments of taxes and royalties to foreign governments and payments to foreign local factor of production, primarily wages and salaries and utilities), less return flows, plus tanker charges, plus net U.S. investment in foreign capacity necessary to produce the oil. Investments required for tankerage were not included, since few U.S. dollars were going into the construction of tankers at the time. Both "first-round" and "higher round" return flows were considered.

Based on this, the 1971 Department of Interior study estimated that net annual dollar outflows resulting from a permanent increase of one million imported barrels per day from the Middle East, phased in over three years, would be about $1.855 billion. A single year's delay, of course, would have been much less costly.

The world changed considerably after 1971, with much higher foreign retained values, and with considerable foreign investments in the United States to finance the outflow of dollars. To get a rough idea of the probable impact of a one-year delay in pipeline completion on the current balance of payments, one need only note that the March 1977 *Survey of Current Business* reports a 1976 net trade deficit of about $16 billion with OPEC[19] on imports of 1.616 billion barrels,[20] or about $9.90 of deficit per imported barrel from OPEC sources. If the balance of payments could have been improved by $9.90 per barrel of North Slope crude run to U.S. refineries, the balance of payments "cost" of a year delay in completion can be computed as in Table 4. Probably the total effect over time on the balance of payments would not be as large as $9.90. Also, this is not a true cost to the country in the usual sense, since the $9.90/bbl. of "saving" on balance of payments does not include the U.S. expenditures necessary to obtain the saving. However, to a federal administration concerned about short-run fluctuations in the balance of payments, the figures in Table 4 indicate that delay in the pipeline could have been costly.

Finally, the Interior Department, in its capacity as an agent for American Native people, could have been concerned about the consequences of delay of payments to Alaska Natives under the Alaska Native Claims Settlement Act. Under the terms of the Act, a 2 percent royalty is paid into the Alaska Native Fund on gross wellhead value of oil and gas sold. The Interior Department could have anticipated the effect that delay of oil sales might have had on the fund. (See Table 5.)

In absolute dollar value, the total impact on the Alaska Native Fund is considerably smaller than in other probable areas of federal concern. However, ANSCA provided only for a fixed schedule of dollar payments from royalties whose total value, $500 million, which could only shrink with continued inflation. Furthermore, if the $500 million was recognized partly as startup capital for the Native corporations in Alaska, then the later this money appeared in the Alaska Native Fund, the less useful it would be in starting up the Native corporations, a key feature of the settlement with the Alaska Natives. Thus, the impact on Native Fund could well have been a significant incentive for Interior to help expedite the pipeline.

Table 4
IMPROVEMENT OF U.S. BALANCE OF PAYMENTS WITH NORTH SLOPE PRODUCTION[1]
(Billions of 1976 Dollars)

	1977	*1978*	*1979*	*1980*	. . .	*1977*	*1998*
Without Delay	$1.812	$4.336	$4.336	$4.336		$4.336	$ 0
With 1-Year Delay	0	1.812	4.336	4.336		4.336	4.336
Increased Value of Balance	1.812	2.524	0	0		0	(4.336)
Present Value of Increase (8% Discount Rate)	1.812	2.337	0	0		0	(.861)

Total Present Value of Cost of Delay = $3.288 billion

1974 Total Present Value of Cost of Delay (8% Discount Rate) = $2.610 billion

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[1] Value for balance of payments purposes of one barrel of North Slope crude oil is assumed to be $9.90. See text.

Table 5
IMPACT OF DELAY ON THE ALASKA NATIVE FUND
(Millions of 1977 Dollars)

Assumptions
(Same a Table 1)

	Payments to Alaska Native Fund							
	1977	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*
Without Delay	$24	$64	$70	$74	$78	$82	$86	$ 22
With 1-Year Delay	0	27	70	74	78	82	86	83
Difference	$24	$37	$ 0	$ 0	$ 0	$ 0	$ 0	$(61)
Difference: Constant 1977 Dollars	$24	$35.2	$ 0	$ 0	$ 0	$ 0	$ 0	$(37.6)
Present Value at 10%	$24	$32.0	$ 0	$ 0	$ 0	$ 0	$ 0	$(19.3)
Present Value at 8%	$24	$32.6	$ 0	$ 0	$ 0	$ 0	$ 0	$(21.9)

Total Present Value of Cost of Delay (Native Fund Earns 10% Return) = $36.7 million

Total Present Value of Cost of Delay (Native Fund Earns 8% Return) = $34.7 million

Total 1974 Present Value of Cost of Delay = $27.6 million (10% Discount Rate) — $27.5 million (8% Discount Rate)

Summary

In summary, our computations show, given some reasonable assumptions concerning the building of the pipeline, rates of price increases of oil, building materials, and labor, that there were significant financial and other incentives to the Alyeska parent companies, state government, and federal government to complete the trans-Alaska pipeline as quickly as possible. Given the constraints of the technical stipulations, environmental protection objectives, and legal requirements, much faster completion was unlikely. However, the incentives were such that all three parties had a strong interest in circumventing anything they might regard as a cause of *unnecessary* delay. To the extent that any stipulation, regulation, or process was regarded by any or all of these parties as a source of "unnecessary" delay (and the definition of "necessary" or "unnecessary" is subject to broad interpretation), each of the parties had ample reason to rearrange construction schedules, ask for (or grant) variances from stipulations, and in general expedite the project by any legal means possible.

1. A history of the changes in the management team is given in Chapters I and II of *The Management, Planning, and Construction of the Trans-Alaska Pipeline System.* Report to the Alaska Pipeline Commission by the Commission's Special Counsel, Terry F. Lenzner of the firm Wald, Harkrader, and Ross, Washington, D.C., August 1, 1977 (hereafter, Lenzner, Final Report). While the Lenzner report makes much of the motives for frequent changes in the management structure of the project and alleged problems with the efficiency of various arrangements, particularly the number of levels involved, that is not the point to be made here. The very shifting of the structure documented by Lenzner may have led to higher project costs, compared to a situation in which the final management structure was known in the beginning.
2. *Alyeska Status Report*, December 1972, p. 1 quoted in Lenzner, Final Report, p. XI3. However, Fluor's planning effort required reworking of many of the designs already prepared by Alyeska and was held up, according to Alyeska, by a failure to select major equipment items, late turnover of Alyeska's work, delays in critical vendor engineering data, and Fluor's general slow pace in "grasping and scoping the project." (Alyeska Status Report, p. 15, July 1973 and p. 14, August 1973 as quoted in Lenzner, Final Report, pp. XI6 and XI7.) Thus, Fluor was granted a shorter effective planning horizon than might be indicated by the hiring date.
3. It is possible that, given what apparently were mistakes in early planning, failure of Alyeska to rectify these by changing management structure might have increased cost even more.
4. Compare Arlon R. Tussing, et al., *Alaska Pipeline Report*, Fairbanks, Alaska, Institute of Social, Economic, and Government Research, 1971, p. 84, which quotes testimony of E. L. Patton before the Legislative Pipeline Impact Committee, April 3, 1971, which has peak-year monthly average employment in Alaska at 6,846, plus or minus 15-20 percent, with latest estimates of the actual 1976 average of about 16,350, computed by ISER economists from Alyeska weekly press releases, 1976.
5. Lenzner devotes considerable time and effort in his Chapter V, Final Report to documenting that many of the causes of long hours lay in management disorganization or outright abuse of payroll procedures, e.g., pp. V23 to V46. Lenzner's preliminary statement regarding cost overruns to the Alaska Pipeline Commission (June 15, 1977) quotes a Telex message from F. P. Moolin of

Alyeska to all Execution Contractors, Pipeline Department Managers, et al., as saying it was "uncommon to find any worker who received less than 70 hours of pay per week." "Productivity/Project Labor Agreement" p. 2 (October 29, 1975). Lenzner's statement to the Commission carries the full title *Preliminary Statement of Terry F. Lenzner, Special Counsel, Alaska Pipeline Commission in Response to Request of the State of Alaska*, and is dated June 15, 1977 (hereafter, cited as Lenzner, Preliminary Statement).

6. Statement of Monte Canfield, Jr., Director, Energy and Minerals Division, U.S. General Accounting Office, before the Senate Committee on Energy and Natural Resources, September 26, 1977, p. 7.
7. See Lenzner, Preliminary Statement, p. IV-1.
8. Lenzner, Final Report, pp. II-33, II-34.
9. Lenzner, Preliminary Statement, p. II-18, paraphrasing an interview with Peter DeMay, Vice President of Project Management, Anchorage, Alaska, June 10, 1977.
10. Performance Bonus Plan, Trans-Alaska Pipeline Project (to Perini Arctic Associated), Article T-5, Calculation of Bonus.
11. The apparent anomoly in both Tables 1 and 2 of constant dollar impacts being larger than current dollar impacts in a period of inflation is due to the fact that the computations assume a mere postponement of income, rather than a total loss. Since oil prices rise rapidly over the period, the offset to current losses by an extra year of the income at the end of twenty years is quite significant in current (inflated) dollar terms, but much less significant when inflation is taken into account.
12. Since overtime is paid at 1.5 times regular salary, more than 1.5 times as many regular hours would have to be added in 1978 to make up for revenue losses on overtime pay in 1976 and 1977. Factors making the total more than 1.5 include the state's lost interest earnings on income taxes received and the fact of a progressive income tax rate structure, which takes a larger "bite" out of overtime hours.
13. The State Pipeline Coordinator's Office actually did produce an estimate of the cost of incremental delay to the state's treasury in February 1975. Given somewhat different assumptions than those used in Table 2, the pipeline coordinator estimated that a year's delay in project startup would cost the state $504.5 million.
14. *An Analysis of the Economic and Security Aspects of the Trans-Alaska Pipeline, Volume II: Supporting Analyses* (Washington, D.C.: Office of Economic Analysis, U.S. Dept. of Interior), December 1971, pp. M-2-1, M-5-2 through M-5-7.
15. *The Oil Import Question: A Report on the Relationship of Oil Imports to the National Security.* Report of the Cabinet Task Force on Oil Import Control (Washington, D.C.: U.S. Government Printing Office), February 1970, p. 31.
16. *Monthly Petroleum Statistics Report* FEA/B-77/379, Federal Energy Administration, National Energy Information Center, July 1977.
17. Ibid.
18. Using the FEA data above, growth in the ratio was about 4.4 percentage points 1974-75, 6.6 points between 1975 and 1976, and 8.3 points between January-June 1976 and January-June 1977.
19. Louis J. Moczar, "U.S. International Transactions: Fourth Quarter and Year 1976," *Survey of Current Business* 57(3):41, March 1977.
20. *Survey of Current Business*, July 1977, p. S-35, reports total U.S. 1976 imports of crude and unfinished oils of 1.947 billion barrels, of which, according to the source in note 21, above, 83 percent was from OPEC nations, or 1.616 billion barrels.

List of Interviews

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Duane Carson, former AOFR, August 29, 1977.
Roger Gray, EEI project manager, April 11; July 12; August 30, 1977.
Jack Gough, former AOFR, August 29, 1977.
Dwight Hovland, soils scientist, August 20, 1977.
Don Keyes, construction coordinator, April 8; September 2, 1977.
Bob King, EEI, August 23, 1977.
Herbert Kittler, AOFR, May 4; August 24, 1977.
Arlan Kohl, technical staff coordinator, April 8; June 9, 1977.
Jack McCoy, AOFR, May 10; August 25, 1977.
Giles McDonald, hydrologist, August 22, 1977.
Leonard McKinney, executive assistant, March 21, 1977.
William Moses, solicitor, March 21, 1977.
Quentin Norgaard, AOFR, August 23, 1977.
Roger Post, EEI, August 23, 1977.
Morris Turner, acting authorized officer, March 21; August 3; August 5; August 16; August 29, 1977.
Richard Wolf, MRI deputy project manager, August 23; August 30, 1977.

Joint Fish and Wildlife Advisory Team

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Allan Carson, state supervisor, March 29; August 30; September 26; October 17, 1977.
Jack Fisher, fisheries engineer, August 9, 1977.
James Glaspell, technical staff, April 6, 1977.
Robert Hallock, former field monitor, August 31, 1977.
James Hemming, federal coordinator, March 17; May 12; June 7; August 31, 1977.
Hank Hosking, assistant federal coordinator, March 17; August 12, 1977.
Nancy Kavanagh, technical staff, August 30; September 27, 1977.
Keith Morehouse, staff wildlife biologist, September 2, 1977.
Lewis Pamplin, former field monitor, August 5, 1977.
Ken Roberson, field monitor/technical evaluations, August 4, 1977.
Julius Rockwell, APO/JFWAT fisheries biologist, July 7; July 12; August 12, 1977.
Lou Swenson, former field monitor, August 17, 1977.
Carl Yanagawa, assistant state supervisor, March 17; August 11, 1977.

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Al Greer, ecologist, March 24, 1977.
Robert Huck, senior engineer, March 24, 1977.
Jim Whaley, ecologist, March 24, 1977.

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Norval Netsch, activity leader, stream alterations. March 22; June 8; October 12, 1977.
Melvin Monson, area administrator, ecological services, May 27, 1977.
LeRoy Sowl, deputy area director, July 7; September 13, 1977.
Gordon Watson, area director, March 22; May 19, 1977.

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Charles Herbert, former commissioner, Alaska Department of Natural Resources, July 13, 1977.
Ray Morris, Environmental Protection Agency, May 17, 1977.
Tom Sexton, pipeline liaison, Alaska Department of Environmental Conservation, May 19, 1977.
Burt Silcock, former national director, Bureau of Land Management, May 11, 1977.
Mike Smith, former chief of habitat, Alaska Department of Fish and Game, May 17; May 19, 1977.
David Spencer, former wildlife refuge supervisor, FWS, June 8, 1977.
Blair Wondzell, former FSO, State Pipeline Coordinator's Office, August 23, 1977.
Gerald W. Zamber, former assistant chief, BLM pipeline division, May 16, 1977.

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Juneau

Dave Cline, Division of Policy Development and Planning, Office of the Governor, July 27, 1977.
Norman Gorsuch, former Alaska attorney general, July 26; July 27, 1977.
Rod Pegues, assistant Alaska attorney general, July 26, 1977.
Jerry Reinwand, deputy commissioner, Alaska Department of Environmental Conservation, July 26, 1977.

Fairbanks

David Klein, University of Alaska, Cooperative Wildlife Research Unit, May 4, 1977.
Dave Norton, former state supervisor, JFWAT, September 1, 1977.
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Guy Martin, Assistant Secretary, Lands and Waters, August 22, 1977.
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*Items in this section are arranged alphabetically, rather than chronologically.

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